



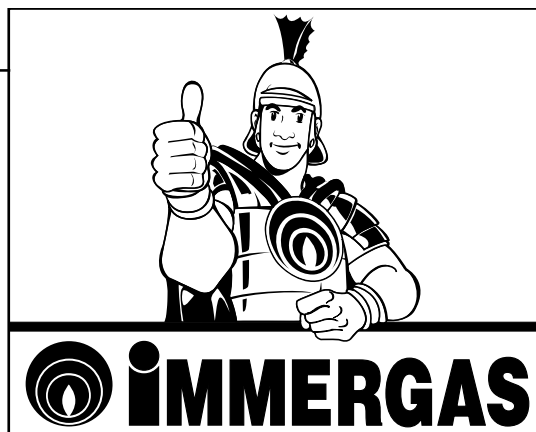
ZEUS Maior

*Hung boilers with storage open chamber
(type C) and forced draught*



User's Manual

*Installer
User
Technician*



Dear Customer,

Congratulations on your purchase of a high quality Immergas product designed to ensure prolonged comfort and safety. As an Immergas customer you can count on a professional Authorised Service Centre, professional personnel to guarantee constant efficiency of your boiler.

Read the following pages carefully as they contain important information on the correct use of your boiler, observe all instructions to make the most of Immergas products.

*Contact our local Authorised Service Centre as soon as possible to request the preliminary test (required to **validate the guarantee**). Our technician will verify correct operating conditions, make the necessary adjustments and will show you how to use the appliance correctly.*

In the event of problems or maintenance requirements, contact our Authorised Service Centre to ensure use of original spare parts and professional service.

General warnings

This instruction booklet is considered an integral part of the product and must be delivered to the user with the appliance.

Store the booklet in a safe place and read carefully before using the appliance as it contains important information to ensure safe installation operation and maintenance.

Installation and maintenance must be performed in compliance with current standards according to the manufacturer's instructions and by qualified personnel.

Incorrect installation can cause damage or physical injury and the manufacturer declines all liability for failure to observe instructions and standards. Maintenance must be performed by qualified personnel. In this case, an Authorised Immergas Service Centre represents a guarantee of professional and qualified services.

The appliance must be used according to the applications as specified in design. Any other use is considered improper and therefore hazardous.

The manufacturer declines all contractual or non-contractual liability for damage caused by incorrect installation or operation and failure to observe relative instructions.

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1 BILER INSTALLATION

1.1 Warnings.

Immergas gas appliances must be installed exclusively by a professionally qualified and authorized technician.

Installation must be performed in compliance with standards UNI and CEI, current legislation and in observance with local technical standards according to a professional code of practice.

The following standards must be observed in particular: UNI-CIG 7129 and 7131 and CEI 64-8 and 64-9.

Before installing the appliance, ensure that it is delivered in perfect condition; if in doubt, contact the supplier immediately. Packaging materials (staples, nails, plastic bags, polystyrene foam etc.) constitute a hazard and must be kept out of the reach of children.

If the appliance is installed inside or between other cabinets or furniture, ensure sufficient space for maintenance; a clearance of 2-3 cm between the boiler casing and the sides of the cabinet is recommended.

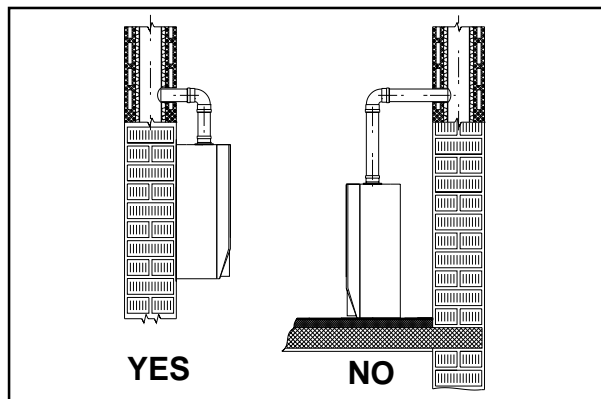
Keep all flammable objects away from the appliance (paper, rags, plastic, polystyrene, etc.).

In the event of malfunctions, faults or incorrect operation, switch the appliance off immediately and contact a qualified technician (e.g. from the Immergas Service centre to ensure use of original spare parts). Never attempt to modify or repair the appliance alone.

Failure to observe the above implies personal responsibility and renders the guarantee null and void.

- Installation standards: these boilers have been

designed exclusively for wall-mounted installation. The wall surface must be smooth, without any protrusions or dents enabling access to the rear section. Boilers must NOT be installed on plinths or floors (see figure).

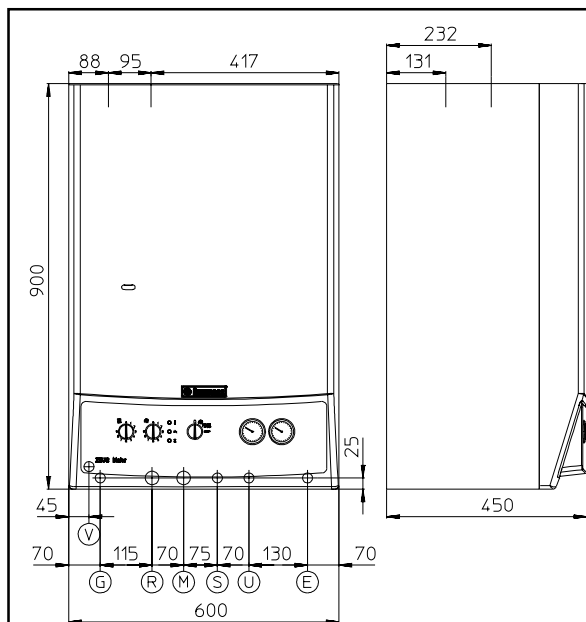


Caution: installation of the boiler on the wall must guarantee a stable and efficient support for the generator. The plugs supplied with the appliance ensure adequate support only if inserted correctly (according to technical standards) in walls comprising bricks or breeze blocks. In the case of walls made from bricks or cavity bricks, partitions with limited static properties, or in any case walls other than those indicated, a static test must be carried out to ensure adequate support. These boilers are used to heat water to below boiling temperature in atmospheric pressure.

They must be connected to a heating system and domestic water circuit suitable to their performance and capacity. These boilers cannot be installed in bedrooms, bath and shower rooms. Neither can they be installed in rooms with open chimneys (fireplaces) without having their own air flow. They must also be installed in a room where the temperature that does not fall below 0°C.

They must not be exposed to atmospheric agents.

1.2 Main dimensions.



Height (mm)	Width (mm)		Depth (mm)	
900	600		450	
Connections				
GAS	SYSTEM		DOMESTIC WATER	
G	R	M	U	E
1/2"	3/4"	3/4"	1/2"	1/2"

Key

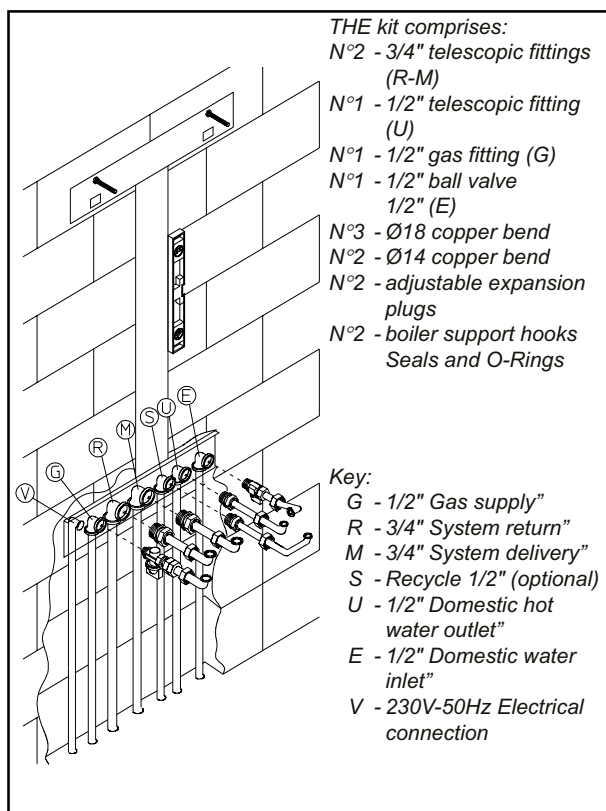
- G - Gas supply
- R - System return
- M - System delivery
- S - Recycle (optional)
- U - Domestic hot water outlet
- E - Domestic water inlet
- V - Electrical connection

INSTALLER

USER

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1.3 Connection unit (supplied standard with the boiler).



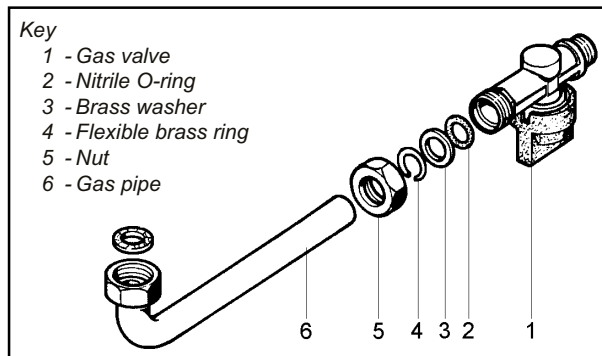
Gas hook-up (Appliance category II_{2H3+}). Immergas boilers are designed to operate with the following types of gas: natural gas (G20) and LPG. Delivery pipelines must feature the same or larger diameters as the 1/2"G boiler fitting.

Before hooking up the gas line, ensure that all system fuel pipelines are perfectly clean, and remove all residue that could impair appliance efficiency.

Also check that the gas corresponds to boiler specifications (see boiler dataplate). If the types are different, the appliance should be converted for operation with the specific type of gas required (see converting the appliance for other gas types).

The gas pressure must also be checked (natural or LPG) according to the type used in the boiler; insufficient levels could reduce generator power and malfunctions. Ensure that the gas valve connection is correct as shown in the assembly sequence in the figure.

Water connection. Before making the water connections, all system piping must be cleaned thoroughly to remove any residue that could impair boiler efficiency. Water connections must be made in a rational sequence using the couplings on the boiler template. The boiler safety valve outlet must be connected to a discharge funnel. Otherwise, the manufacturer declines any responsibility in case of flooding if the drain valve cuts in.




Electrical Connection. The Zeus Maior boiler is designed with IPX4D protection rating. Electrical safety of the unit is guaranteed only when it is correctly connected to an efficient earthing system as specified by current safety regulations.

Caution: Immergas S.p.A. declines any responsibility for damage or physical injury caused by failure to connect the boiler to an efficient earthing system or failure to observe CEI reference standards.

Also ensure that the electrical installation corresponds to maximum absorbed power specifications as shown on the boiler dataplate.

Boilers are supplied complete with an "X" type power cable without plug.

The power cable must be connected to a 230V-50Hz mains supply with the correct pole sequence L-N and earth connection ; the mains power supply must also be equipped with a multi-pole circuit breaker with contact opening gap of at least 3 mm. In the event of power cable replacement, contact an Authorized Immergas Service Centre for assistance.

The power cable must be laid as shown in the figure on page 5.

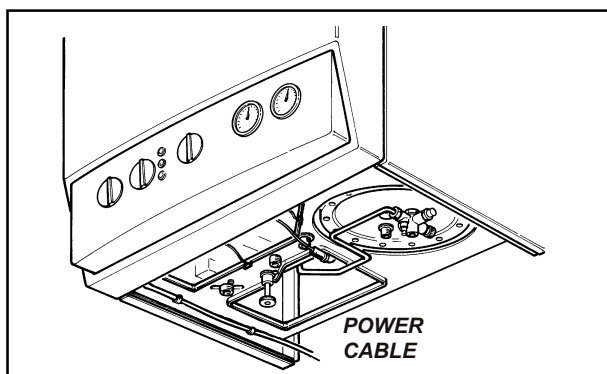
In the event of mains fuse replacement on the control card, use a 2A quick blow fuse. For the main power supply to the appliance, never use adapters, multi-sockets or extension leads.

N.B.: when connecting the appliance, if the correct L-N polarity is not followed, the boiler does not detect the flame and inhibits lighting. Also whenever L-N polarity is not followed, if the neutral is live with residual voltage over 30V, the boiler will probably operate just the same (but only temporarily). Measure voltage with suitable instruments, without using a phase screwdriver. If the electrical supply is of the 230 V Phase-Phase type, to ensure the same safe conditions as those existing in case the boiler is fed with a Phase-Neutral supply, install an adapter kit for Phase-Phase supplies, available on request. Contact an Authorized Immergas Service Centre for installation of the kit.

On/Off room thermostat electrical connection.

On/Off. Connect the thermostat or On/Off Timer-thermostat to terminals 34 and 35, eliminating jumper P1. It must have exclusively Class II (standard EN 60335-1) electrical isolation, see the wiring diagram on page 20. The room thermostat contact, after connection, works at mains voltage and must be able to commute a minimum current of 0.8A.

Caution: Make sure the thermostat contact is of the “clean” type, i.e. independent of the mains voltage, otherwise the electronic adjustment board will be damaged. Boiler pipelines must never be used to earth the electrical or telephone lines. Ensure elimination of this risk before making the boiler electrical connections.



1.4 Installing air intake and flue exhaust terminals.

Immergas supplies various solutions separately from the boiler for the installation of air intake and flue extraction, fundamental for boiler operation.

N.W.: The boiler must be installed exclusively with an original Immergas air intake and flue extraction system as specified by standards UNI 7129. This system is identifiable by a special and distinctive marking.

The flue ducts have not to be near or in contact with inflammable materials, and they have not to pass through buildings and walls made of inflammable materials.

The types of terminals available from Immergas comprise:

- Concentric horizontal intake and exhaust kit. Installation of this kit must be in compliance with technical standards UNI 7129, and D.P.R. 412/93, as amended by D.P.R. 551/99 and by standards in local building regulations and subsequent amendments. D.P.R. 412 as amended by D.P.R. 551, restricts use of this type of system exclusively to the following cases:
 - “installation of heat generators in buildings composed of a single unit”;
 - “standard replacement of individual heat generator appliances”.

This terminal enables air intake and exhaust of flues directly outside the building. The horizontal kit can be installed with a rear outlet, right-hand outlet,

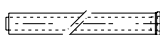
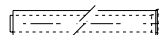
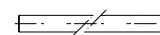
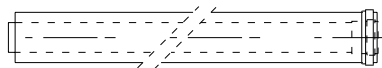


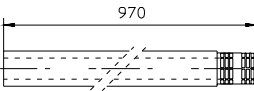

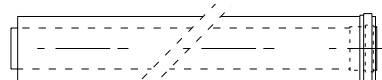


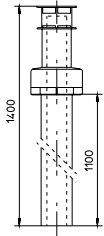
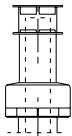
left-hand outlet and front outlet as required (see page 8).

- Concentric vertical air intake and exhaust kit. This terminal enables vertical air intake and flue exhaust directly outside the building (see page 10).
- Separator kit (Ø 80/80). This kit enables air intake to outside the building and flue exhaust via a flue (see page 11).

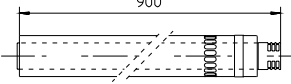
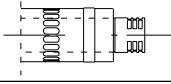


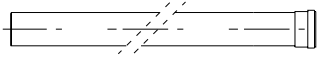
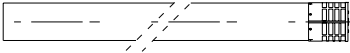



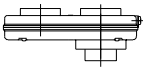
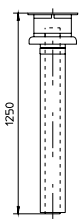
The innermost duct is used for flue exhaust to the flue and the outermost duct is used for air intake from outside the building. Both ducts can be routed in any direction (see page 11), except for the insulated separator kit Ø 80/80 that with the standard components cannot start with crossed ducts.

- Resistance factors and equivalent lengths. Each flue extraction system component is designed with a *resistance factor* based on preliminary tests and specified in the table below. The resistance factor for individual components does not depend either on the type of boiler on which it is installed or the actual dimensions. It is based on the temperature of fluids conveyed through the ducts and therefore varies according to applications for air intake or flue exhaust. Each component has a resistance corresponding to a specific length in metres of pipe with the same diameter; the so-called equivalent length, based on the ratio between different resistance factors, for example : Ø80 90° bend; resistance factor on intake 5; 1-metre Ø80 pipe; resistance factor on intake 2.3; equivalent length of 90° Ø80 bend = $5 : 2.3 = 2.2$ m of Ø80 pipe on intake. In the same way each component has a resistance factor corresponding to a specific length in metres of a pipe with a different diameter, for example a concentric 90° bend Ø60/100 Resistance Factor 21; pipe Ø80 m1 on exhaust, Resistance Factor = 3; Equivalent length of 90° bend Ø60/100 = $21 : 3 = 7$ m of Ø80 pipe on exhaust. *All boilers have a maximum resistance factor based on testing at 100.* The maximum admissible resistance factor corresponds to the resistance detected with the maximum admissible pipe length with each type of Terminal Kit installed. This information enables calculations to verify the possibility of various configurations of flue extraction systems.

Resistance Factors and Equivalent Lengths.

DUCT TYPE	Resistance Factor (R)	Equivalent length in metres of concentric pipe Ø 60/100 	Equivalent length in metres of concentric pipe Ø 80/125 	Equivalent length in metres of pipe Ø 80 
Concentric pipe Ø 60/100 1 m 	Intake and exhaust 16.5	m 1	m 2,8	Intake 7.1m Exhaust 5.5 m
90° bend concentric Ø 60/100 	Intake and exhaust 21	m 1,3	m 3,5	Intake 9.1m Exhaust 7.0m
45° bend concentric Ø 60/100 	Intake and exhaust 16.5	m 1	m 2,8	Intake m 7.1m Exhaust m 5.5m
Terminal complete with concentric horizontal intake-exhaust Ø 60/100 	Intake and exhaust 46	m 2,8	m 7,6	Intake m 20m Exhaust m 15m
Terminal complete with concentric horizontal intake-exhaust Ø 60/100 	Intake and exhaust 32	m 1,9	m 5,3	Intake m 14m Exhaust 10.6m
Concentric pipe Ø 80/125 m 1 	Intake and exhaust 6	m 0,4	m 1,0	Intake 2.6m Exhaust 2.0m
90° bend concentric Ø 80/125 	Intake and exhaust 7.5	m 0,5	m 1,3	Intake 3.3m Exhaust 2.5m
45° bend concentric Ø 80/125 	Intake and exhaust 6	m 0,4	m 1,0	Intake 2.6m Exhaust 2.0m
Terminal complete with concentric vertical intake-exhaust Ø 80/125 	Intake and exhaust 33	m 2,0	m 5,5	Intake 14.3m Exhaust 11.0m
Terminal complete with concentric vertical intake-exhaust Ø 80/125 	Intake and exhaust 26.5	m 1,6	m 4,4	Intake 11.5m Exhaust 8.8m

Resistance Factors and Equivalent Lengths.

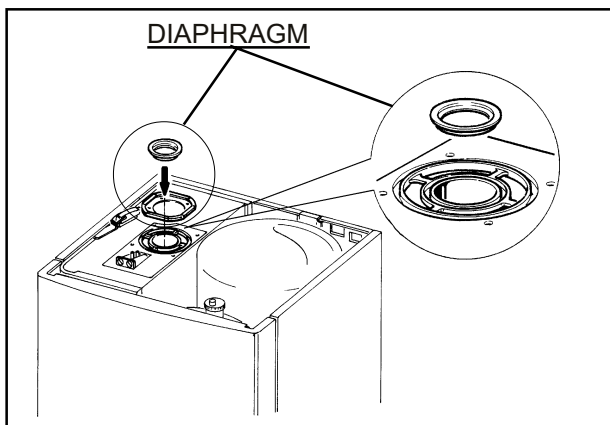
DUCT TYPE	Resistance factor (R)	Equivalent length in metres of concentric pipe Ø 60/100	Equivalent length in metres of concentric pipe Ø 80/125	Equivalent length in metres of pipe Ø 80
Terminal complete with concentric horizontal intake-exhaust Ø 80/125 	Intake and exhaust 39	2.3 m	6.5 m	Intake 16.9 m Exhaust 13 m
Terminal complete with concentric horizontal intake-exhaust Ø 80/125 	Intake and exhaust 34	2.0 m	5.6 m	Intake 14.8 m Exhaust 11.3 m
Concentric adapter from Ø 60/100 to Ø 80/125 with condensate collector 	Intake and exhaust 13	0.8 m	2.2 m	Intake 5.6 m Exhaust 4.3 m
Concentric adapter from Ø 60/100 to Ø 80/125 	Intake and exhaust 2	0.1 m	0.3 m	Intake 0.8 m Exhaust 0.6 m
Pipe Ø 80 m 1 (with or without insulation) 	Intake 2,3	0.1 m	0.4 m	Intake 1.0 m
	Exhaust 3	0.2 m	0.5 m	Exhaust 1.0 m
Complete intake terminal Ø 80 m 1 (with or without insulation) 	Intake 5	0.3 m	0.8 m	Intake 2.2 m
Intake terminal Ø 80 Exhaust terminal Ø 80 	Intake 3	0.2 m	0.5 m	Intake 1.3 m
	Exhaust 2.5	0.1 m	0.4 m	Exhaust 0.8 m
90° bend Ø 80 	Intake 5	0.3 m	0.8 m	Intake 2.2 m
	Exhaust 6,5	0.4 m	1.1 m	Exhaust 2.1 m
45° bend Ø 80 	Intake 3	0.2 m	0.5 m	Intake 1.3 m
	Exhaust 4	0.2 m	0.6 m	Exhaust 1.3 m
Sdoppiato parallelo Ø 80 da Ø 60/100 a Ø 80/80 	Intake and exhaust 8.8	0.5 m	1.5 m	Intake 3.8 m Exhaust 2,9 m
Terminal complete with concentric vertical intake-exhaust Ø 60/100 	Intake and exhaust 41.7	2.5 m	7 m	Intake 18 m Exhaust 14 m

INSTALLER

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Diaphragm installation. To ensure correct operation of the boiler, a diaphragm (see figure) must be installed on output of the sealed chamber before the intake and exhaust duct. Selection of a suitable diaphragm depends on the type of ducting used and maximum length: calculations can be made using the values in the tables:



N.W.: Diaphragms are supplied as standard with the boiler.

DIAPHRAGM	Duct length in metres Ø 60/100 horizontal
Ø 44	Da 0 a 0,5
Ø 47	Da 0,5 a 1,5
NONE	Oltre 1,5

DIAPHRAGM	Duct length in metres Ø 60/100 vertical
Ø 44	Da 0 a 3
Ø 47	Da 3 a 4
NONE	Oltre 4

DIAPHRAGM	*Duct length in metres Ø 80 horizontal duct with two bends
Ø 44	Da 0 a 17
Ø 47	Da 17 a 24
NONE	Oltre 24

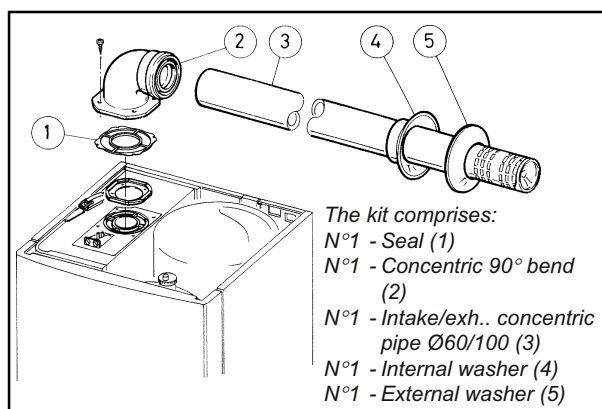
* The values for maximum length are considered with 1 metre of exhaust pipe and the remaining on intake.

DIAPHRAGM	*Duct length in metres Ø 80 vertical duct without bends
Ø 44	Da 0 a 22
Ø 47	Da 22 a 29
NONE	Oltre 29

DIAPHRAGM	Duct length in metres Ø 80/125 horizontal
Ø 44	Da 0 a 1
Ø 47	Da 1 a 3
NONE	Oltre 3

DIAPHRAGM	Duct length in metres Ø 80/125 vertical
Ø 44	Da 0 a 5
Ø 47	Da 5 a 8
NONE	Oltre 8

Horizontal intake-exhaust kit Ø 60/100. Kit assembly: install the bend with flange (2) on the innermost hole of the boiler taking care to insert the seal (1) and tighten with the screws supplied in the kit Join the male end (smooth section) of terminal pipe (3) to the female section (with lip-seals) of bend (2) to the end stop and ensure that the internal and external washers are fitted to achieve perfect sealing of all couplings.

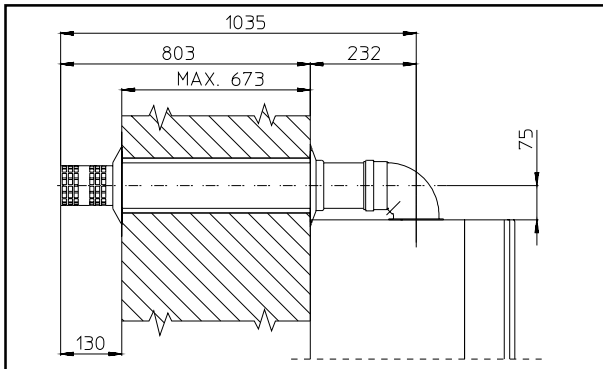


- Snap-fit couplings of concentric pipes or extensions and elbow fittings Ø60/100. To install snap-fit extensions with other elements of the boiler assembly, proceed as follows: fit the concentric pipe or elbow with the male section (smooth) on the

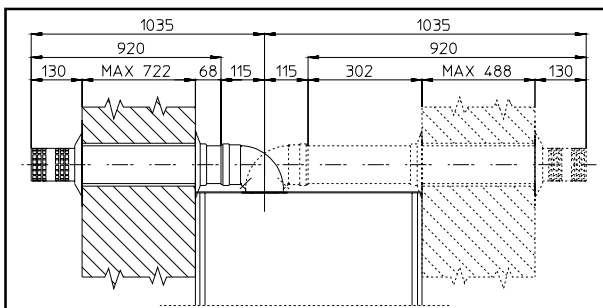
female section (with lip seal) to the end stop on the previously installed to ensure sealing efficiency of the coupling.

The horizontal intake-exhaust kit Ø 60/100 can be installed with a rear, right-hand, left-hand, or front outlet as required.

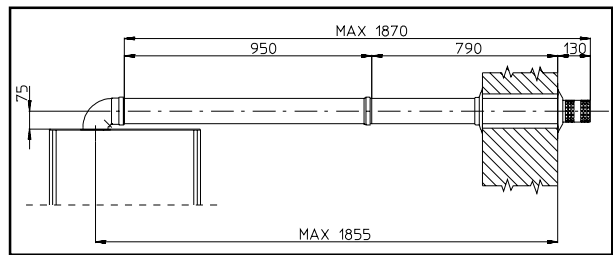
- Application with rear outlet. The 970 mm pipe length enables partial routing through a maximum thickness of 673 mm. Normally the terminal should be shortened. Calculate the distance by adding the following: Part thickness + internal protrusion + external protrusion. Minimum protrusion values are given in the figure below.



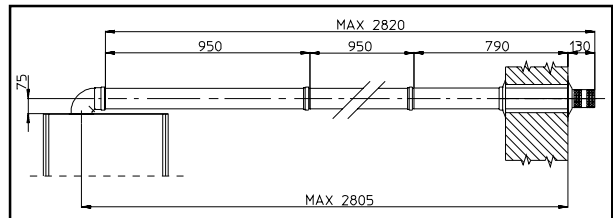
- Application with lateral outlet. Using the horizontal intake-exhaust kit only, without the special extensions, enables routing through a wall thickness of 722 mm with the left-hand outlet and 488 with the right-hand outlet.



- Extensions for horizontal kit. The horizontal intake-exhaust kit Ø 60/100 can be extended up to a max. horizontal distance of 3000 mm including the grille terminal and excluding the concentric bend on output of the boiler. This configuration corresponds to a resistance factor of 100. In this case special extensions must be requested.

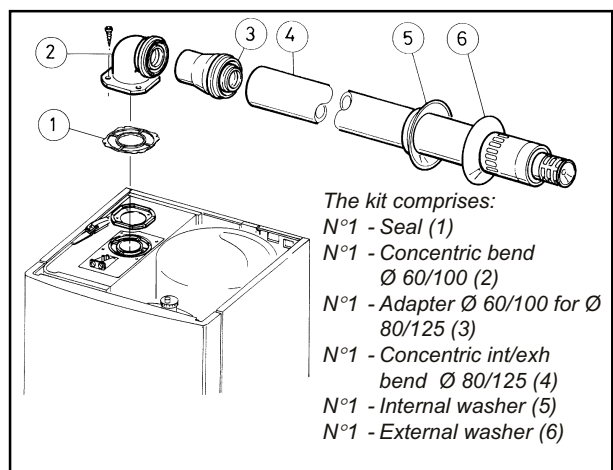


Connection with N°1 extension. Distance between vertical boiler axis and external wall: 1855 mm.



Connection with N°2 extensions. Distance between vertical boiler axis and external wall: 2805 mm.

Horizontal intake-exhaust kit Ø 80/125. Kit assembly: install the bend with flange (2) on the innermost hole of the boiler taking care to insert the seal (1) and tighten with the screws supplied in the kit Fit the adapter (3) with the male section (smooth) in the female section of the bend (2) (with lip seal) to the end stop. Fit the concentric terminal Ø 80/125 (4) with the male section (smooth) in the female section of the adapter (3) (with lip seals) to the end stop, ensuring that the internal and external washers are fitted to ensure sealing efficiency of all couplings.



- Snap fit extension pipe fittings and concentric elbows Ø 80/125. To install snap-fit extensions with other elements of the boiler assembly, proceed as follows: fit the concentric pipe or elbow with the male section (smooth) on the female section (with lip seals) to the end stop on the previously installed element to ensure sealing efficiency of the coupling.

INSTALLER

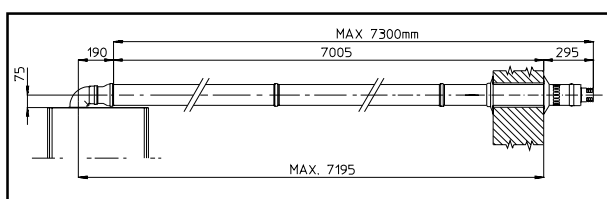
USER

TECHNICIAN

Caution: if the exhaust terminal and/or extension concentric pipe needs shortening, consider that the internal duct must always protrude by 5 mm with respect to the external duct.

Normally the horizontal intake/exhaust kit Ø 80/125 is used in the event of using particularly long extensions; the kit Ø 80/125 can be installed with a rear, right-hand, left-hand or front outlet.

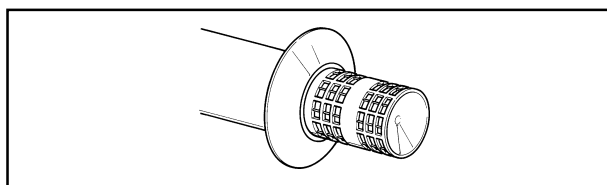
- Extensions for horizontal kit. The horizontal intake/exhaust kit Ø 80/125 can be extended up to a *maximum horizontal length of 7300 mm* including the terminal grille and excluding the concentric bend on output of the boiler and the adapter Ø 60/100 in Ø 80/125 (see figure). This configuration corresponds to a resistance factor of 100. In this case special extensions must be requested.



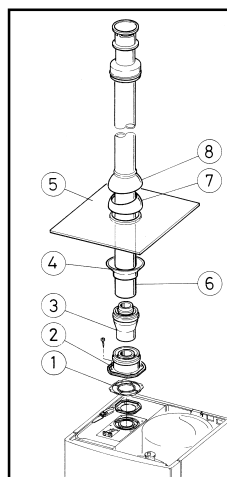
N.B.: when installing the ducts, a section clamp with pin must be installed every 3 metres.

- External grille. The intake/exhaust terminal models Ø 60/100 and Ø 80/125, if correctly installed, blend with external building aesthetics. Ensure that the silicon washer is fitted snugly against the external wall.

N.B.: for safety purposes, do not totally or partially obstruct the boiler intake/exhaust terminal even temporarily.



Vertical kit with aluminium tile Ø 80/125. Kit assembly: install the concentric flange (2) on the innermost hole of the boiler taking care to insert the seal (1) supplied with the kit and tighten by means of the screws supplied with the boiler. Fit the male section (smooth) of the adapter (3) on the female section of the concentric flange (2). Installing the imitation aluminium tile. Replace the tile with the aluminium sheet (5), shaping it to ensure off-flow of rainwater. Position the fixed half-shell (7) on the aluminium tile and insert the intake/exhaust pipe (6). Fit the concentric terminal Ø 80/125 (6) with the male section (smooth) in the female section of the adapter (3) (with lip seals) to the end stop, ensuring that the washer (4) is fitted to ensure sealing efficiency of all couplings.



The kit comprises:

- N°1 - Seal (1)
- N°1 - Female concentric flange (2)
- N°1 - Adapter Ø 60/100 for Ø 80/125 (3)
- N°1 - Washer (4)
- N°1 - Aluminium tile (5)
- N°1 - Int./Exh. concentric pipe Ø 80/125 (6)
- N°1 - Fixed half-shell (7)
- N°1 - Mobile half-shell (8)

- Snap fit extension pipe fittings and concentric elbows. To install snap-fit extensions with other elements of the boiler assembly, proceed as follows: fit the concentric pipe or elbow with the male section (smooth) on the female section (with lip seals) to the end stop on the previously installed element to ensure sealing efficiency of the coupling.

Caution: if the exhaust terminal and/or extension concentric pipe needs shortening, consider that the internal duct must always protrude by 5 mm with respect to the external duct.

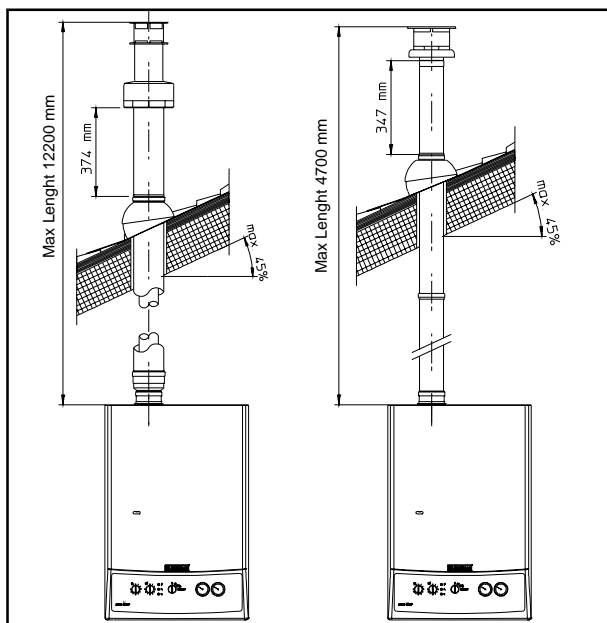
This specific terminal enables flue exhaust and air intake in a vertical direction.

N.B.: the vertical kit Ø 80/125 with aluminium tile enables installation on terraces and roofs with maximum gradient of 45% (24°) and the height between the terminal cap and half-shell (374 mm) must be strictly observed.

This vertical kit configuration can be extended to a *maximum length of 12200 mm* in a vertical straight route, including the terminal (see figure below). This configuration corresponds to a resistance factor of 100. In this case specific extensions must be requested.

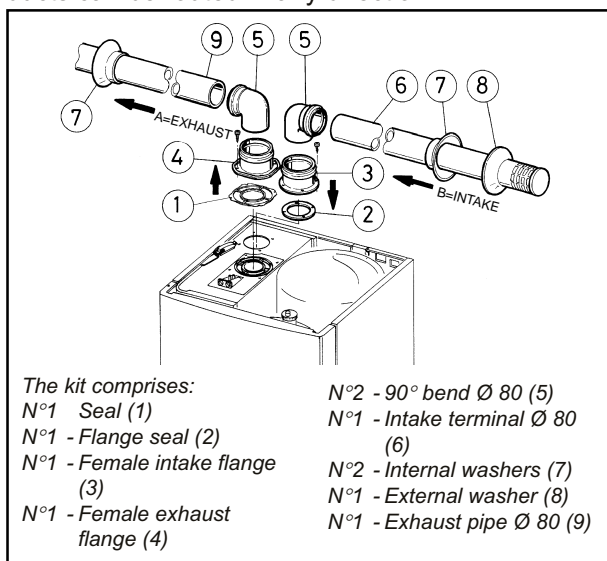
Terminal Ø 60/100 can also be used for vertical exhaust, in conjunction with concentric flange code no. 3.011141 (sold separately). Height between the terminal cap and half-shell (374 mm) must be strictly observed (see drawing below).

This vertical kit configuration can be extended to a maximum length of 4700 mm in a vertical straight line, including the terminal (see figure below).



Separator kit Ø 80/80. The separator kit Ø 80/80, enables the division of the flue exhaust pipes and air intake pipes according to the diagram shown in the figure.

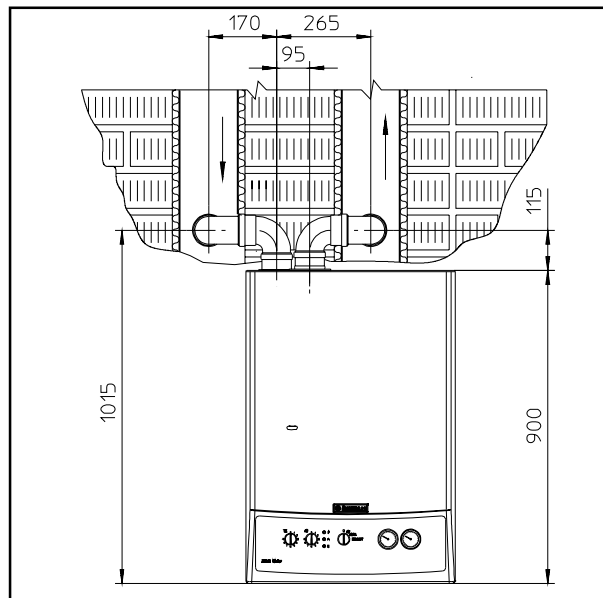
Combustion products are expelled from duct (A). Air is taken in through duct (B) for combustion. Both ducts can be routed in any direction.



- Assembly of separator kit Ø 80/80. Install flange (4) on the internal hole of the boiler taking care to insert the seal (1) supplied with the kit and tighten by means of the screws on the boiler. Remove the flat flange on the outermost hole and replace with flange (3) inserting seal (2) already fitted on the boiler and tighten with the screws supplied. Join bends (5) with the male section (smooth) in the female section of the flanges (3 and 4). Fit the intake terminal (6) with the male section (smooth) in the female section of the flange (5) to the end stop with the internal and external washers inserted. Join the exhaust pipe (9) with the male section (smooth) in the female section of the bend (5) to the end stop ensuring that the internal washer is fitted and to ensure sealing efficiency of the

couplings.

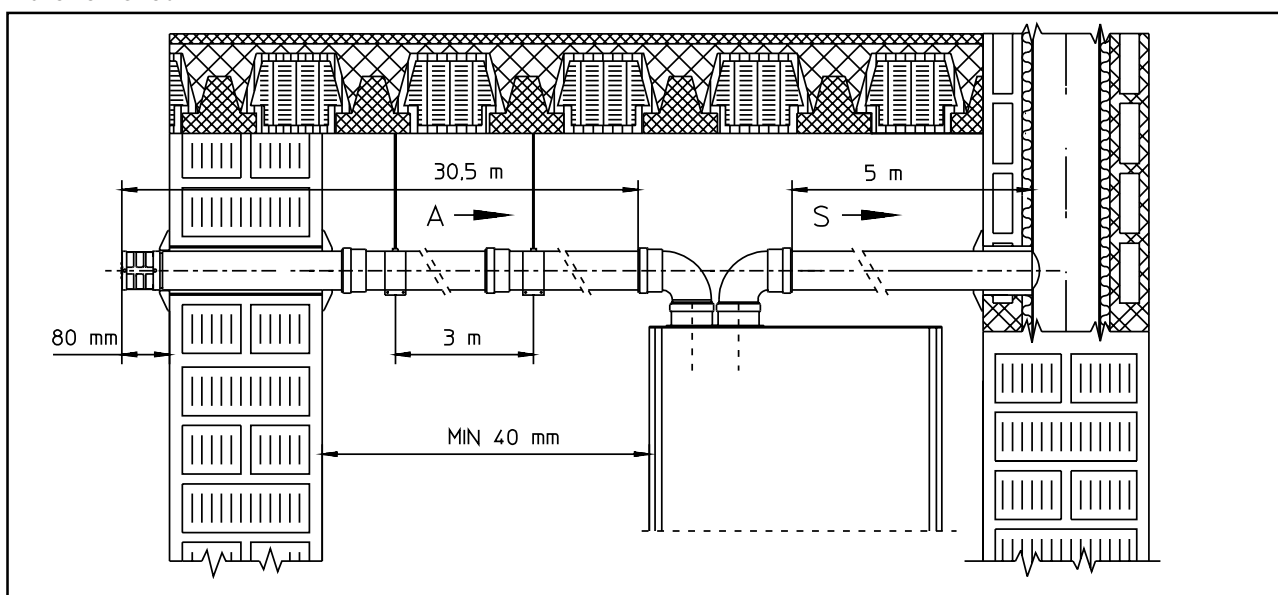
- Snap fit extension pipe fittings and elbows. To install snap-fit extensions with other elements of the boiler assembly, proceed as follows: fit the pipe or elbow with the male section (smooth) on the female section (with lip seals) to the end stop on the previously installed element to ensure sealing efficiency of the coupling.
- Installation clearances. The following figure shows the minimum installation clearances for the terminal separator kit Ø 80/80 in maximum admissible conditions.



- Extensions for separator kit Ø 80/80. The maximum straight length (without bends) on a vertical route, for intake and exhaust pipes Ø80 is 41 metres, 40 of which on intake and 1 on exhaust. This total length corresponds to a resistance factor of 100. The total effective length, obtained by adding the length of intake and exhaust pipes Ø 80 must not exceed the maximum values specified in the table below. If you need to use *accessories or mixed components* (for instance, passing from separator Ø 80/80 to a concentric pipe), it is possible to calculate the maximum extension by using a factor of resistance for each component or its *equivalent length*. The total of the resistance factors must not exceed 100.
- Temperature drops in flue ducts. To avoid the problem of flue condensation in the exhaust pipe Ø 80, due to cooling through the walls, *the length of the duct must be restricted to within 5 metres*. If longer distances have to be covered, use pipe diameters Ø 80 with insulation (see insulated separator kit Ø 80/80).

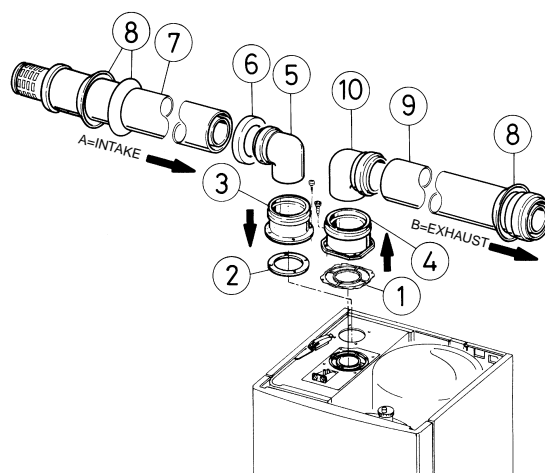
Maximum effective lengths (including intake terminal with grille and two 90° bends)			
NON-INSULATED DUCT		INSULATED DUCT	
Exhaust (metres)	Intake (metres)	Exhaust (metres)	Intake (metres)
1	36.0*	6	29.5*
2	34.5*	7	28.0*
3	33.0*	8	26.5*
4	32.0*	9	25.5*
5	30.5*	10	24.0*
		11	22.5*
		12	21.5*

* The intake duct can be increased by 2.5 metres if the bend on exhaust is eliminated, 2 metres if the intake bend is eliminated or 4 metres of both bends are removed.



N.B.: when installing the Ø 80 ducts, a section clamp with pin must be installed every 3 metres.

Insulated separator kit Ø 80/80. Kit assembly: install flange (4) on the central hole of the boiler taking care to insert the seal (1) supplied with the kit and tighten by means of the screws on the boiler. Remove the flat flange on the outermost hole and replace with flange (3) inserting seal (2) already fitted on the boiler and tighten with the screws supplied. Insert and slide cap (6) onto bend (5) on the male section (smooth) and join bends (5) with the male section (smooth) in the female section of flange (3). Fit bend (10) with the male section (smooth) in the female section of flange (4). Join the intake terminal (7) with the male section (smooth) in the female section of bend (5) to the end stop, ensuring that washers (8) are inserted to achieve correct installation between the pipe and wall and fit the end cap (6) on terminal (7). Join the exhaust pipe (9) with the male section (smooth) in the female section of the bend (10) to the end stop, ensuring that the washer (8) is already inserted for correct installation between the pipe and flue.



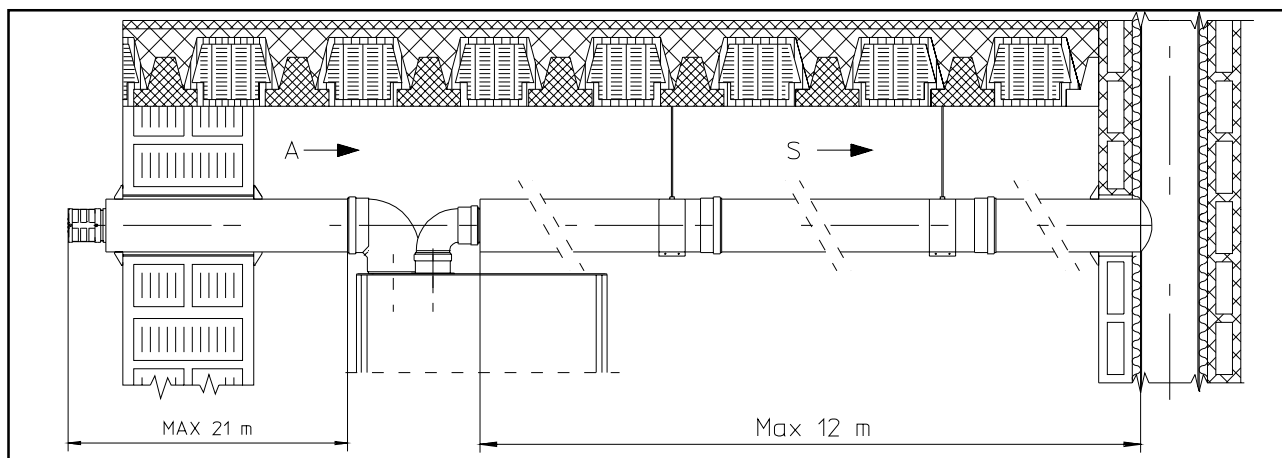
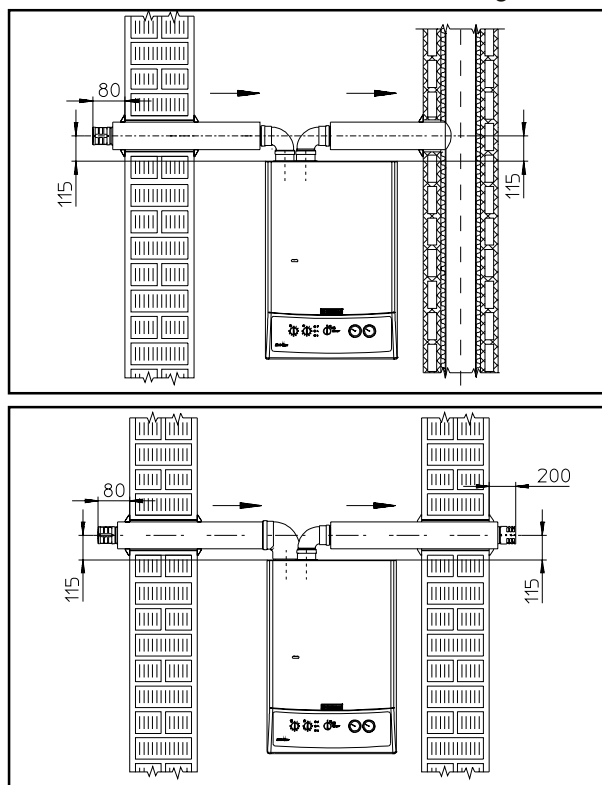
The kit comprises:

- N°1 - Seal (1)
- N°1 - Flange seal (2)
- N°1 - Female intake flange (3)
- N°1 - Female exhaust flange (4)
- N°1 - 90° bend Ø 80 (5)
- N°1 - Pipe end cap (6)
- N°1 - Insulated intake terminal Ø 80 (7)
- N°3 - Washers (8)
- N°1 - Insulated exhaust pipe Ø 80 (9)
- N°1 - Concentric 90° bend Ø 80/125 (10)

- Snap fit extension pipe fittings and elbows. To install snap-fit extensions with other elements of the boiler assembly, proceed as follows: fit the concentric pipe or elbow with the male section (smooth) on the female section (with lip seal) to the end stop on the previously installed to ensure sealing efficiency of the couplings.
- Insulation of separator terminal. In the event of problems of condensation of flues inside the exhaust pipes or on the outside surface of the intake pipes, on request Immergas supplies insulated intake and exhaust pipes. Insulation may be necessary on exhaust pipes due to excessive drops in temperature of flues during conveyance from the boiler and on the intake pipes as air on input (cold) may cause the external pipe temperature lower than the dew point of the ambient air. The figures below illustrate different applications of insulated pipes.

Insulated pipes comprise an internal $\varnothing 80$ concentric pipe and a $\varnothing 125$ external pipe with static air jacket. Technically it is not possible to start with both $\varnothing 80$ elbows insulated as clearances will not allow this type of installation. However an insulated elbow can be used by selecting either the intake or exhaust pipe. If an insulated intake pipe is used,

the flange must be inserted to the end stop on the flue extraction flange to ensure that the height of the two intake and exhaust outlets is aligned.



- Temperature loss in insulated ducting. To avoid the problem of flue condensation in insulated exhaust $\varnothing 80$ pipes, due to cooling via the wall, *the exhaust pipe length must be restricted to 12 metres*. The figure above illustrates a typical insulation application in which the intake pipe is short and the exhaust pipe very long (over 5 m). The entire intake pipe is insulated to prevent condensation of humid air in the boiler environment in contact with the cooled pipe conveying cool outdoor air. The entire exhaust pipe is insulated with the exception of the elbow on output of the splitter, to reduce heat dispersion from the duct and prevent formation of flue condensate.

N.W.: when installing the insulated ducts, a section clamp with pin must be installed every 2 metres.

1.5 Flue exhaust via flues.

Flue exhaust does not necessarily have to be connected a branched type traditional flue. Flue exhaust can be connected to a special LAS type multiple flue. Flues must be specially designed according to specifications in the standard UNI-CIG 10641 by qualified professional personnel. Chimney or flue sections for connection of the exhaust pipe must comply with requirements as laid down in standards UNI-CIG 7129 and UNI-CIG 10641.

1.6 Ducting flues.

With a specific “ducting system” it is possible to reuse existing flues, chimneys and technical slots to discharge the products of combustion of the boiler. Ducting requires using ducts declared to be suited for the purpose by the manufacturer, following the installation and user instructions, provided by the manufacturer, and the requirements of the UNI 10845 standard.

1.7 Chimneys/flues.

General notes A chimney/flue used to exhaust combustion products must be designed as follows:

- *ducting must ensure sealing of combustion products, be waterproof and insulated;*
- construction in incombustible material suitable to resist normal mechanical stress, heat and action of combustion products or condensation;
- ducting routed vertically without reductions/throttles;
- adequate insulation to avoid condensation or cooling of flue gas, in particular if installed outside the building or in rooms without heating;
- be adequately spaced, or, be fitted with an air jacket for insulation from zones with combustible and/or easily flammable materials;
- *installation of a solid materials collection unit below the first flue channel at a height of at least 500mm, fitted with a metal airtight door;*
- designed with an internal circular, square or rectangular section (in that latter two cases with rounded angles with a radius no less than 20 mm). Hydraulically equivalent sections are also admitted;
- installation of a chimney terminal at the top of the flue in compliance with specifications below; if there is no chimney terminal, it is anyhow necessary to comply with standards UNI 10641.
- without mechanical suction devices installed at the top of the duct;
- in flues routed inside or against inhabited buildings, there must be no risk of pressure surges.

Chimney caps. These devices are installed on single or multiple flues. These devices are installed to facilitate dispersion of combustion products also in adverse weather conditions and prevent deposit of foreign matter. Chimney caps must meet the following requirements:

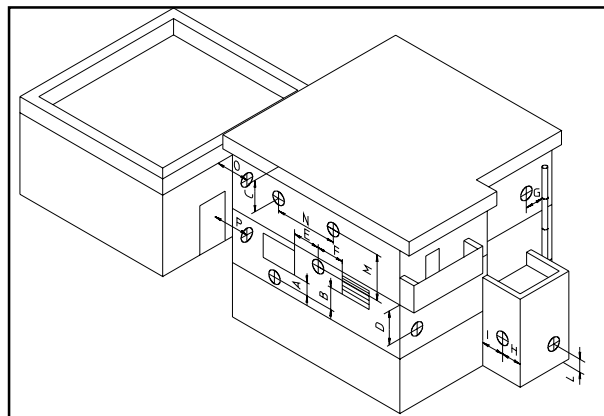
- useful output section no less than double that of the flue/chimney;
- suitably designed to prevent penetration of rain or snow in the flue/chimney;
- designed to ensure constant exhaust of combustion products with any direction or angle of wind.

The outlet height, corresponding to the height of the top of the flue/chimney, regardless of chimney caps, must be outside the “backflow zone”, to avoid the

risk of counterpressure that prevents the free release of combustion products into the atmosphere. Therefore always observe the minimum heights indicated in the figures in standards UNI 7129.

Positioning the draft terminals. Draft terminals must:

- be installed on external perimeter walls of the building;
- be positioned (see figure) according to the minimum distances specified in current technical standards; in particular according to paragraph 4.4.2.3 of standard UNI 7129 and subsequent amendments and integrations.



Fumes exhaust on natural draught appliances in open top closed environments. In spaces closed on all sides with open tops (ventilation pits, light wells, inner courtyards, etc.), direct discharge of fumes is allowed for natural or forced draught gas appliances with a heat output from 4 to 35 kW, provided the specifications of current technical standards are complied with (UNI 7129 par. 4.7).

1.8 System filling.

Once the boiler is connected, proceed with filling the system through the filler cock (see figure page 19). Filling is performed at low speed to ensure release of air bubbles in the water via the boiler and heating system vents.

The boiler has a built-in automatic venting valve on the expansion tank located on the side of the sealed chamber. Check that the cap is loosened. Open the vent valves on the radiators.

Close vent valves only when water is delivered.

Close the filling valve when the boiler pressure gauge indicates approx. 1.2 bar.

N.B.: During these operations, turn on the circulating pump at intervals by means of the main switch on the control panel. *Vent the circulating pump by loosening the front cap and keeping the motor running. Retighten the cap afterwards.*

1.9 Gas system start-up.

To start up the system proceed as follows:

- open windows and doors;
- avoid presence of sparks or naked flames;

- vent all air from pipelines;
- check gas intake sealing efficiency with the boiler gas shutoff valve closed, checking that there is no gas transfer for at least 10 minutes.

1.10 Boiler start-up (ignition).

The following conditions are required for boiler start-up:

- ensure gas intake sealing efficiency with the shutoff valves closed and subsequently open with gas valve closed over an interval of 10 minutes in which no gas transfer must be detected by the meter;
- ensure that the type of gas used corresponds to boiler settings;
- switch on the boiler and ensure correct ignition;
- ensure that the gas flow rate and pressure values correspond to manual specifications (see page 26);
- ensure that the safety device is engaged in the event of gas supply failure and check activation time;
- check activation of the main circuit-breaker switch upstream of the boiler and on the unit;

- check that the concentric intake/exhaust terminal (if fitted) is not blocked.

The boiler must not be started up in the event of failure to comply with any of the above.

Preliminary boiler testing must be carried out by a qualified technician (the Immergas authorized Technical Assistance service is qualified to carry it out free of charge). The boiler guarantee is valid as of the date of testing.*

The test certificate and guarantee is issued to the user on completion.

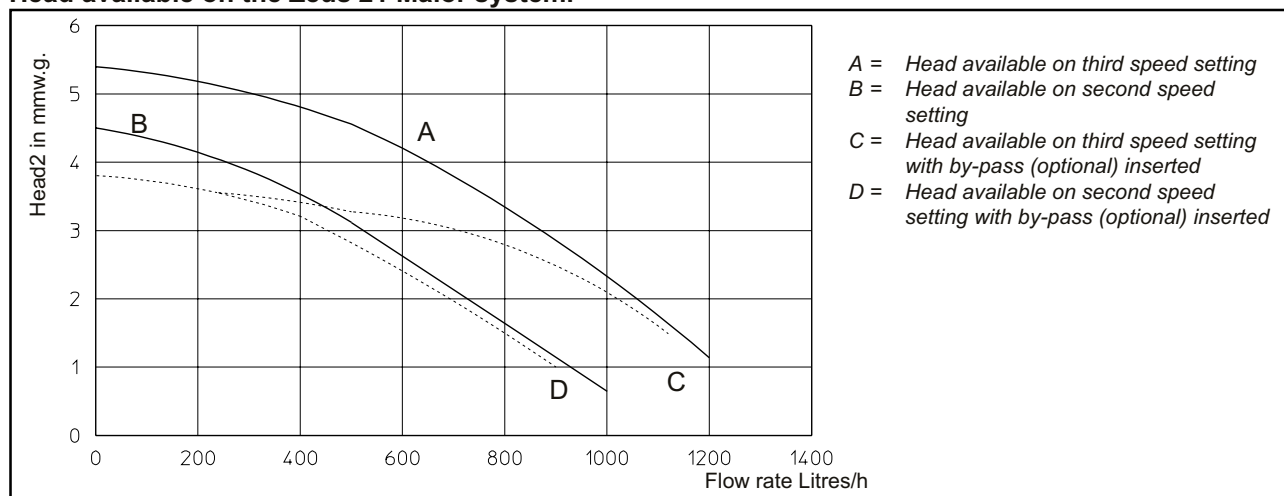
*** N.B.:** *the free preliminary testing does not include fumes analysis (where required) which is borne by the client.*

1.11 Circulating pump.

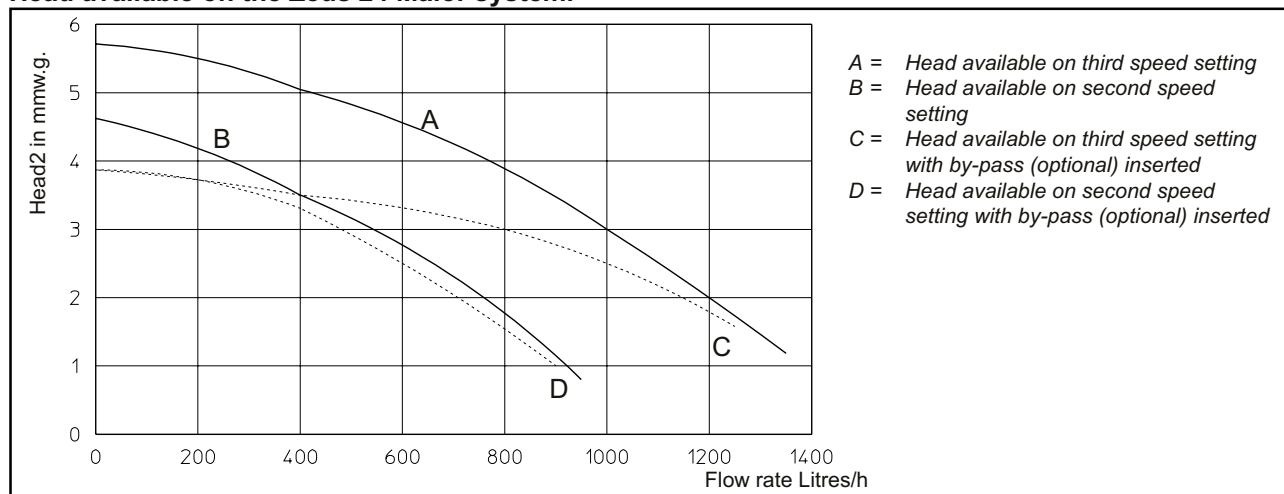
Zeus Maior series boilers are supplied with a built-in circulating pump with 3-position electric speed control. The boiler does not operate correctly with the circulating pump on first speed.

To ensure optimal boiler operation, in the case of new systems (single pipe and modul) use the circulating pump at maximum speed. The circulation pump is already fitted with a capacitor.

Head available on the Zeus 21 Maior system.



Head available on the Zeus 24 Maior system.



Pump release. After a prolonged period of disuse, if the pump is blocked, unscrew the front cap and turn the motor shaft using a screwdriver. Take great care during this operation to avoid damage to the motor.

1.12 Domestic hot water boiler.

The Zeus Maior boiler is of the storage type with a capacity of 60 litres. An amply dimensioned stainless-steel coil wound heat exchange pipe considerably reduces hot water production times. These boilers, built with jacket, bottoms, in stainless steel (AISI 316L), guarantee long life.

The assembly and welding (T.I.G.) construction concepts are carefully prepared down to the smallest details in order ensure top reliability.

The bottom inspection flange ensures a practical control of the boiler and the coil exchange pipe as well as easy inside cleaning.

Located on the flange cover are domestic water connection fittings (cold inlet and hot outlet) and the Magnesium Anode cap inclusive of the same, supplied standard to protect the inside of the boiler against corrosion.

N.B.: Have an authorized technician (e.g. Immergas Authorized Technical Assistance Service) check the efficiency of the Magnesium Anode every year. The boiler is arranged for insertion of the domestic water recycle connection.

1.13 Kits available on request.

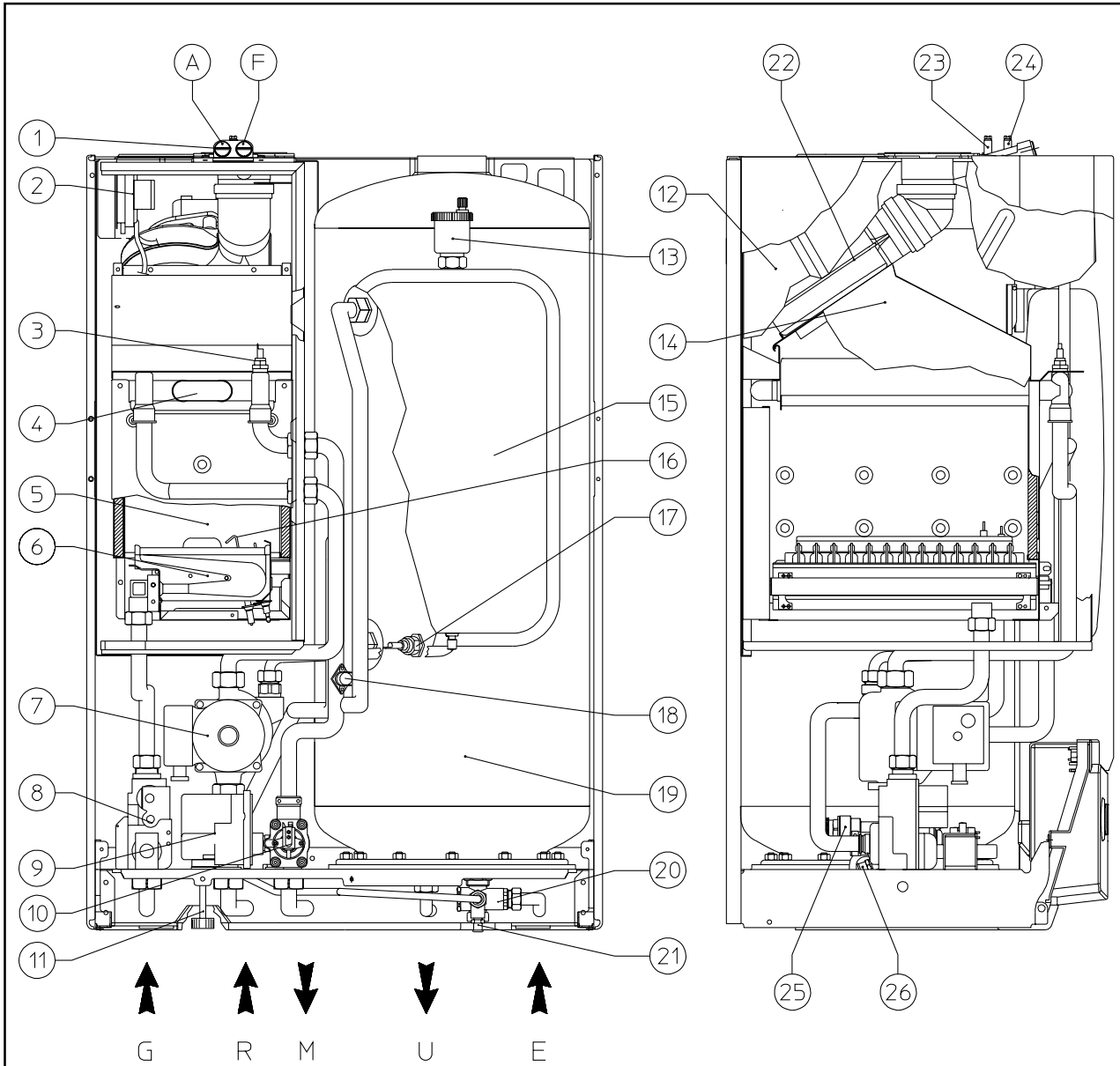
- Expansion tank kit for hot domestic water (on request). If the inlet pressure exceeds 3 bar, or if pressure reducers or check valves are installed on the domestic hot water circuit or if the air-cushion that forms at the top of the boiler becomes depleted, the expansion of water contained in the boiler subsequent heating, can cause leaks from the safety valve. In this case an expansion vessel of suitable capacity for the domestic water will suffice.
- Recycle kit (on request). The boiler is arranged for application of the recycle kit. Immergas supplies a series of fittings and connections for connecting the boiler to the domestic circuit. The recycle kit connection is also given on the installation template.
- Kit of system shutoff valves (on request). The boiler is designed for installation of system shutoff valves for insertion on delivery and return pipelines of the connection assembly. This kit is particularly useful for maintenance as it allows the boiler to be emptied without having to drain the entire system.
- Polyphosphate batching kit (on request). The polyphosphate batching unit prevents the formation of limescale over time and maintains constant heat exchange conditions and production of domestic hot water. The boiler is designed for application of the polyphosphate batching unit.
- By-pass kit (on request). If zone valves are installed on the heating system, or case of insufficient water circulation, Immergas supplies by request the

system By-Pass Kit to be installed on the boiler delivery and return connections. In these conditions a sufficient water flow to the boiler is guaranteed.

The head/flow rate curve is shown in the diagram above.

The above kits are supplied complete with instructions for assembly and use.

1.14 Zeus Major boiler components.



Key:

- 1 - Intake sockets (air A) - (flue gases F)
- 2 - Fan safety pressure switch
- 3 - Heating NTC limit and regulation sensor
- 4 - Primary heat exchanger
- 5 - Combustion chamber
- 6 - Burner
- 7 - Circulating pump
- 8 - Gas valve
- 9 - Motor-operated 3-way valve
- 10 - Circulating pump safety flow switch
- 11 - System filler cock
- 12 - Sealed chamber
- 13 - Air vent valve

- 14 - Flue extractor hood
- 15 - Expansion tank
- 16 - Ignition/detection plugs
- 17 - Domestic circuit NTC sensor
- 18 - Overtemperature safety thermostat
- 19 - Boiler 316L stainless steel
- 20 - Domestic circuit 8 bar safety valve
- 21 - Boiler drain valve
- 22 - Flue extraction fan
- 23 - Positive signal pressure socket
- 24 - Negative signal pressure socket
- 25 - System 3 bar safety valve
- 26 - System drain cock

INSTALLER

USER

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2 USE AND MAINTENANCE INSTRUCTIONS

2.1 Free preliminary testing.

After completion of all installation operations (including system filling) within and no later than 30 days, contact an authorized technician (e.g. Immergas Assistance Service).

The Immergas Service carries out preliminary testing operations on the boiler free of charge, at the same explaining how to use the boiler*.

N.B.: The preliminary testing by an authorized technician is indispensable for boiler efficiency and warranty validity; the testing ensures optimal Immergas boiler efficiency; reliability, efficiency and energy saving.

* **N.B.:** *the free preliminary testing does not include fumes analysis (where required) which is borne by the client.*

2.2 Cleaning and Maintenance.

Important: The user must have the heating system serviced at least once a year and a combustion test (fume test) carried out at least once every two years in accordance with that given in the system handbook (art. 11 D.P.R. 412/93, as amended by D.P.R. 551/99).

This ensures that the optimal safety, performance and operation characteristics of the boiler remain unchanged over time.

We recommend stipulating a yearly cleaning and maintenance contract with your zone technician.

2.3 General Warnings.

Never expose the wall-mounted boiler to direct va-

pours from a cooking surface.

Use of the boiler by unskilled persons or children is strictly prohibited.

Never touch the flue extraction terminal (if fitted) due to the risk of burning caused by high temperatures; For safety purposes, check that the concentric air intake/flue exhaust terminal (if fitted), is not blocked. If temporary shutdown of the boiler is required, proceed as follows:

- drain the heating system if anti-freeze is not used;
- shut off all electrical, water and gas supplies.

In the case of work or maintenance to structures located in the vicinity of ducting or devices for flue extraction and relative accessories, switch off the appliance and on completion of operations ensure that a qualified technician checks efficiency of the ducting or other devices.

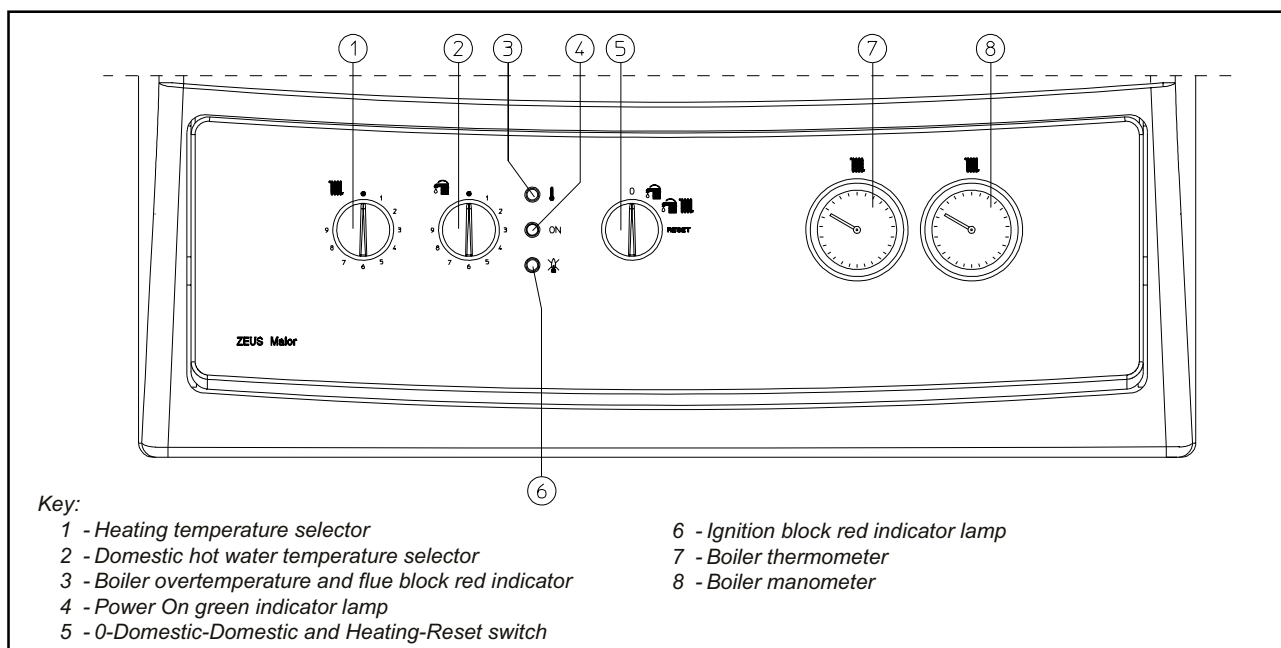
Never clean the appliance or connected parts with easily flammable substances.

Never leave containers or flammable substances in the same environment as the appliance.

• **Caution:** use of components involving use of electrical power requires observance of the following rules:

- never touch the appliance with wet hands or other parts of the body and never touch when barefoot;
- never pull electrical cables or leave the appliance exposed to atmospheric agents (rain, sunlight, etc.);
- the appliance power supply cable must never be replaced by the user;
- in the event of damage to the cable, switch off the appliance and contact exclusively qualified personnel for replacement;
- in the event of prolonged periods of disuse, turn off the main power switch.

2.4 Zeus Maior - Control panel.



Boiler ignition. Before lighting, make sure that the system is full of water and that manometer (6) indicates a pressure of 1 - 1.2 bar.

- Open the gas valve upstream of the boiler.
- Turn the main switch (5) to Domestic or Domestic and Heating (indicator lamp 4 on).

With the switch set to (🏠) the heating control selector (1) is inhibited, and the domestic water temperature is regulated via selector (2).

With the switch set to (🏠🔥) the heating adjustment selector (1) is used to regulate the temperature of radiators, while selector (2) is used for the domestic water, turn the selectors clockwise to raise the temperature, anticlockwise to lower.

Boiler operation is now automatic. With no specific indications, it is advisable to keep the domestic water regulation selector (1) between the values 3 and 6, as this position provides an optimum water temperature without forming scale.

Overtemperature block. Red indicator lamp (3) on. If during operation a fault causes the temperature to exceed 100°C the boiler goes on "overtemperature" block (indicator lamp 3 on). To eliminate the "overtemperature block", turn the main switch (5) temporarily to the Reset position. If this function is activated repeatedly, contact a qualified technician for assistance (e.g. Immergas Technical Services Centre).

Flue block - Red indicator lamp (3) on. During operation, if the fumes exhaust duct does not work properly the boiler goes on "flue block" (indicator light 3 on). To eliminate the "block", turn the main switch (5) temporarily to the Reset position. If this function is activated repeatedly, contact a qualified technician for assistance (e.g. Immergas Technical Services Centre).

Ignition block - Red indicator lamp (6) on. Each time heating or hot water production is required the boiler lights automatically. If the boiler does not light within 10 seconds, the boiler goes on "ignition block" (indicator lamp 6 on).

To eliminate the "block", turn the main switch (5) temporarily to the Reset position.

On initial ignition or following a prolonged period of inactivity the "ignition block" may need to be inhibited. If this function is activated repeatedly, contact a qualified technician for assistance (e.g. Immergas Technical Services Centre).

Boiler shutdown. Turn off the main switch (5) by turning it to "0" (yellow indicator lamp 4 off) and close the gas supply valve upstream of the appliance. Never leave the boiler switched on if left unused for prolonged periods.

2.5 Restore heating system pressure.

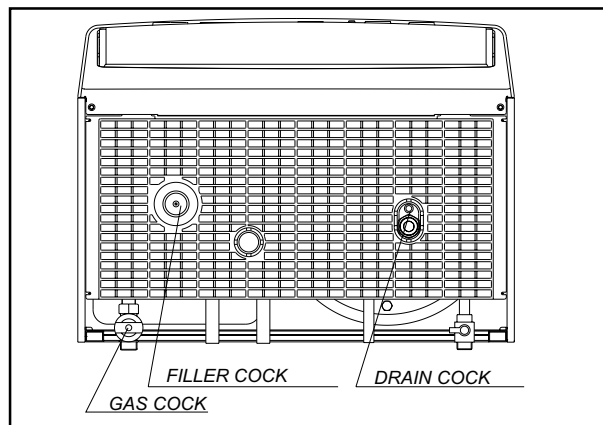
Periodically check the system water pressure.

The boiler pressure gauge should read a pressure of between 1 and 1.2 bar.

If the pressure falls below 1 bar (with the circuit cold)

restore normal pressure via the valve located at the bottom of the boiler (see figure).

N.B.: close the valve on completion. If pressure values reach around 3 bar the safety valve may be activated. In this case contact a professional technician for assistance. In the event of frequent pressure drops, contact qualified personnel for assistance to eliminate system leakage.



2.6 Draining the system.

To drain the boiler, use the special drain cock (see figure on page 17).

Before draining, ensure that the filling valve is closed.

2.7 Boiler emptying.

To drain the boiler, use the special drain cock (see figure above and on page 17).

N.B.: Before carrying out this operation, close the boiler cold water inlet cock and open any domestic circuit hot water cock to allow air to enter the boiler.

2.8 Anti-freeze protection.

The boiler comes standard with an anti-freeze function that starts the pump and burner when the room temperature falls below 4°C. The anti-freeze function is guaranteed if the boiler is fully operative and not in "block" status, and is electrically fed with the main switch set to Summer or Winter. To avoid continued operation in the event of prolonged absence, the system must be drained completely or anti-freeze substances should be added to the heating system water. In both cases the boiler domestic water circuit must be drained. In appliances subject to frequent draining, the system must be refilled with suitably treated water to eliminate hardness that may cause limescale formation.

2.9 Casing cleaning.

Use damp cloths and neutral detergent to clean the boiler casing. Never use abrasive or powder detergents.

2.10 Decommissioning.

In the event of permanent shutdown of the boiler, contact professional personnel for the procedures and ensure that the electrical, water and gas supply lines are shut off and disconnected.

3 BOILER START-UP PRELIMINARY CHECK

To start up the boiler, proceed as follows:

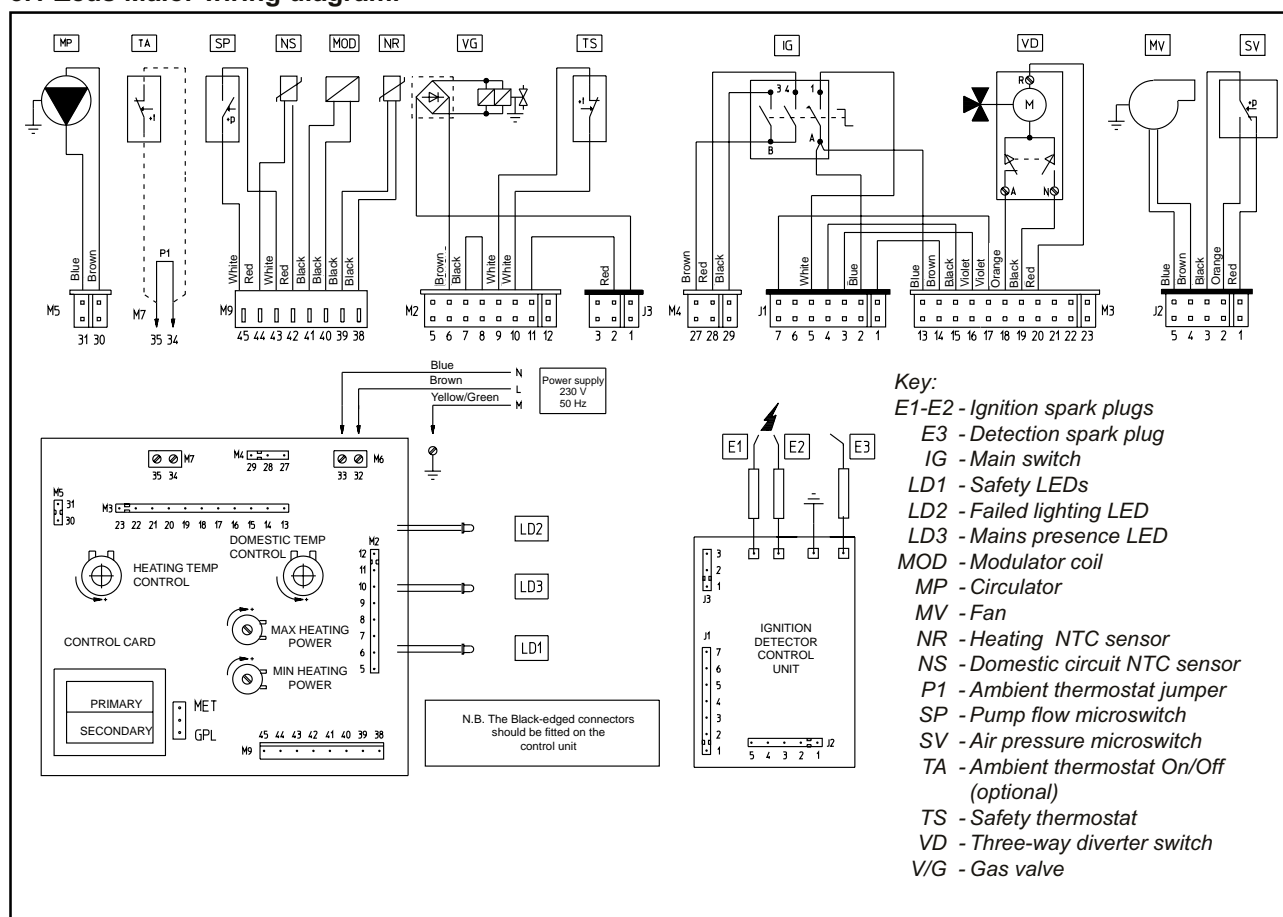
- ensure that the declaration of conformity of installation is supplied with the appliance;
- check gas supply circuit tightness with the On-Off valves closed and subsequently open with gas valve closed; no gas transfer must be read on the meter for 10 minutes
- ensure that the type of gas used corresponds to boiler settings;
- ensure connection to a 230V-50Hz power mains, correct L-N polarity and the earthing connection;
- switch on the boiler and ensure correct ignition;
- make sure the gas maximum, medium and minimum flow-rate and pressure values correspond to those given in the handbook on page 20.
- ensure activation of the safety device in the event

of gas supply failure, as well as the relative activation time;

- check activation of the main circuit-breaker switch upstream of the boiler and on the unit;
- check that the intake and/or exhaust terminals are not blocked;
- ensure activation of the safety pressure switch in the event of air supply failure;
- ensure activation of all regulation devices;
- seal the gas flow rate regulation devices (if settings are modified);
- ensure production of hot domestic water;
- ensure tightness of water circuits.
- Check adequate ventilation and/or aeration of the installation room.

If any checks/inspection give negative results, do not start the boiler.

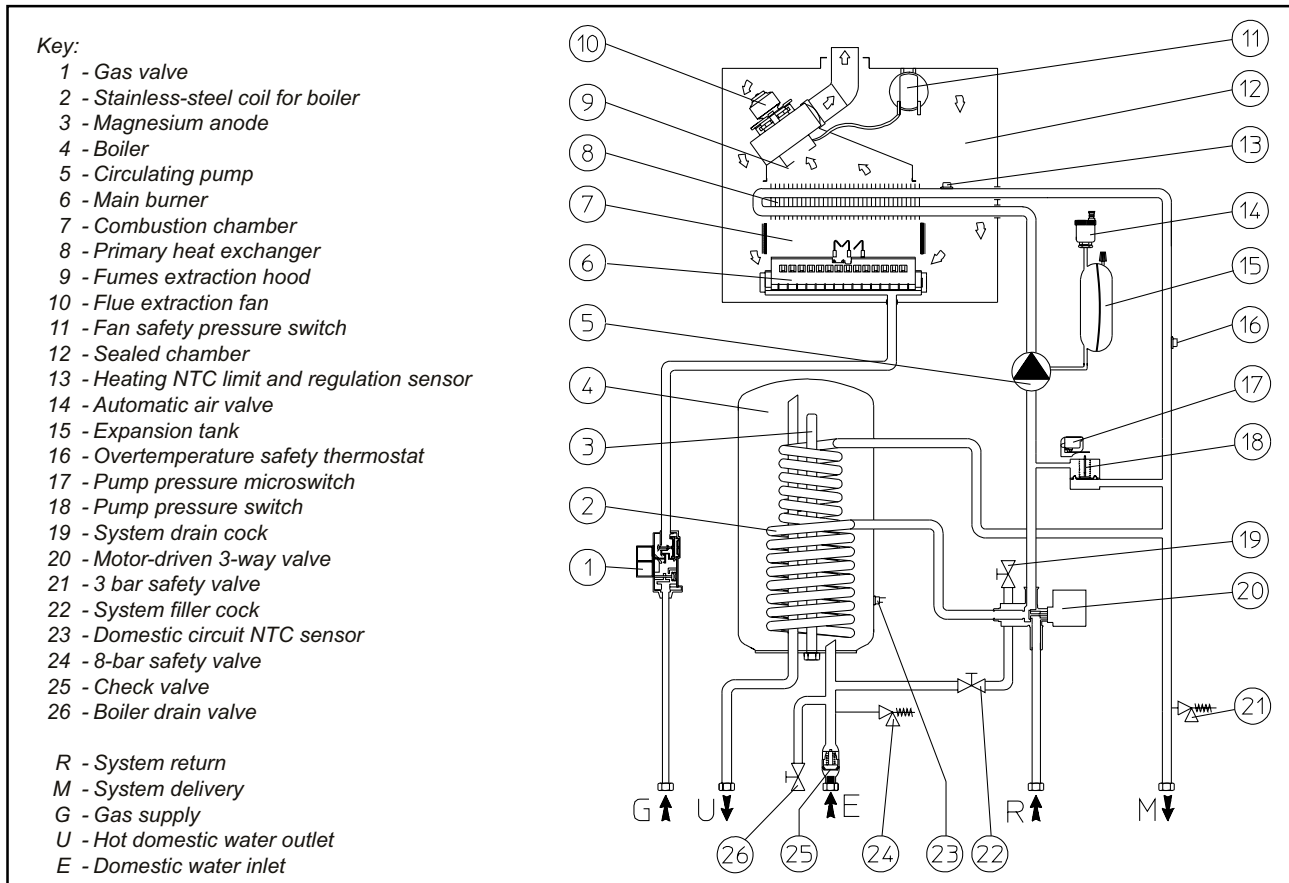
3.1 Zeus Maior wiring diagram.



Room thermostat: the boiler is designed for application of a Room Thermostat. The Room Thermostat must have exclusively class II

electrical isolation (standard EN 60335-1). Connect the Room Thermostat to terminals 34-35 and remove jumper P1.

3.2 Zeus Maior hydraulic diagram.



INSTALLER

USER

TECHNICIAN

3.3 Troubleshooting.

N.B.: maintenance must be performed by qualified personnel (e.g. Immergas Technical Service Centre).

- Smell of gas. Caused by leakage from gas circuit pipelines. Check sealing efficiency of gas intake circuit.
- The fan works but the discharge of ignition on the burner ramp is not activated. The fan may start but the safety air pressure switch does not change the contact. In the case check the following:

- 1) that the intake-exhaust duct is not too long (over admissible length).
- 2) that the intake-exhaust duct is not partially blocked (on either the exhaust or intake side).
- 3) that the diaphragm on the flue exhaust outlet is commensurate with the length of the intake/exhaust ducting.
- 4) that the sealed chamber is perfectly sealed.
- 5) that the fan power supply voltage is minimum 196 V.

- Irregular combustion (red or yellow flame). This may be caused by a dirty burner, blocked reed valve, or incorrect installation of the intake-exhaust terminal. Clean the specified components and ensure correct installation of the terminal.
- Frequent activation of the temperature overload thermostat. This may be caused by lack of water in the boiler, insufficient water circulation in the

circuit or a blocked circulator. Check via the pressure gauge that values are within admissible limits. Check that radiator valves are not all closed and that the circulating pump is working correctly.

- Presence of air in the system. Check opening of the cap on the special air valve (see fig. page 17). Ensure that system pressure and pre-charge of the expansion vessel are within the set limits; the pre-charge value for the expansion vessel must be 0.8 bar, and system pressure between 1 and 1.2 bar.
- Ignition block; see pages 19 and 4 (electrical connection).
- Boiler NTC sensor faulty. The boiler does not have to be emptied when replacing the NTC sensor because the sensor is not in direct contact with the domestic hot water present inside the boiler.

3.4 Converting the boiler to other types of gas.

If the boiler has to be converted to a different gas type to that specified on the dataplate, request the relative conversion kit for quick and easy conversion. Boiler conversion must be carried out by a qualified technician (e.g. Immergas Technical Assistance Service).

To convert to another type of gas the following operations are required:

- main burner nozzle replacement;
- move jumper (13 page 23) to the correct position for type of gas required (Natural or LPG.);
- adjustment of first slow step of burner ignition;
- adjustment of maximum boiler heating power;
- adjustment of minimum boiler heating power;
- adjust (eventually) heating power;
- seal the gas flow rate regulation devices (if settings are modified).
- after completing conversion, apply the sticker, present in the conversion kit, near the dataplate. Using an indelible marker pen, cancel the data relative to the old type of gas.

These adjustments must be made with reference to the type of gas used, following that given in the table on page 26.

3.5 Checks following conversion to other type of gas.

After ensuring that conversion was carried out with the required nozzle diameters and that setting is to the fixed pressure, make sure:

- that there is no flame return in the combustion chamber;
- that the burner flame is not excessively high or low and is stable (does not detach from burner);
- the pressure tester used for calibration is perfectly closed and there are no leaks in the gas circuit.

N.B.: all boiler adjustment operations must be performed by a skilled technician (e.g. from an Immergas Technical Services Centre). Adjustment of the burner must be carried out using a differential “U” or digital type pressure gauge, connected to the pressure outlet at the top of the sealed chamber (part 23 page 17) and the outlet pressure socket on the gas valve outlet (part 6 page 23), with reference to the pressure value specified in the table on page 26 according to the type of gas to be used with the boiler.


3.6 Zeus Maior adjustments.

- Minimum heating power adjustment (see figure page 23). The minimum heating power is adjusted by means of the brass screw (3) on the gas valve;
- turn off the power supply to the modulating coil (simply detach a faston); turn the screw clockwise to increase pressure and counterclockwise to decrease it. On completion of adjustment,

reconnect the modulating coil. Boiler minimum heat output pressure must be not be adjusted to less than the values given in the tables on page 26 according to the type of gas.

- Adjustment of boiler rated heat output (see figure on page 23).

N.B.: adjust only after setting minimum pressure values;

- Turn the domestic hot water temperature knob (2 page 18) to the maximum setting;
- Open the hot domestic water valve to avoid modulation;
- Adjust the rated boiler heating power by means of plastic nut (4), according to maximum pressure values specified in the tables on page 26 according to the type of gas;
- turn clockwise to increase heating power, and anticlockwise to decrease.
- Heating power adjustment (see figure on page 23). Adjust the room heating output by means of the trimmer (12 page 23) located on the boiler modulation electronic card, as follows:
 - close the domestic hot water cock and turn the switch (5 page 18) to ();
 - set the heating control selector (1 page 18) to maximum temperature to prevent modulation;
 - adjust heat output by turning the trimmer (12 page 23) on the modulation card, keeping to the values given in the table on page 26 according to the type of gas, for boiler variable heat output. Turn the trimmer clockwise to increase pressure and counterclockwise to decrease.

N.B.: to adjust the gas valve, remove the plastic cap (9) and rotate screw (5). Afterwards, refit the cap and screw.

N.B.: the Avio Maior boiler is equipped with electronic modulation that adapts boiler power to actual room heating requirements. Therefore the boiler operates normally in a variable gas pressure range between the minimum and maximum heating power according to the system heat load.

N.B.: the Avio Maior boiler is produced and set to rated power during heating.

3.7 Zeus Maior slow ignition adjustment.

After setting the minimum and maximum heating settings for the appliance the first slow ignition step can be set for the gas valve. Adjust by means of trimmer (11) on the boiler electronic modulation card. Rotate clockwise to increase pressure and counterclockwise to decrease. To obtain slow or gradual inter-ignition of the burner, we recommend setting the first step for slow ignition at 25 mm H₂O for boilers operating with natural gas and 70 mm H₂O for boilers operating with LPG.

N.B.: never fall below the minimum heating power when setting the slow ignition values.

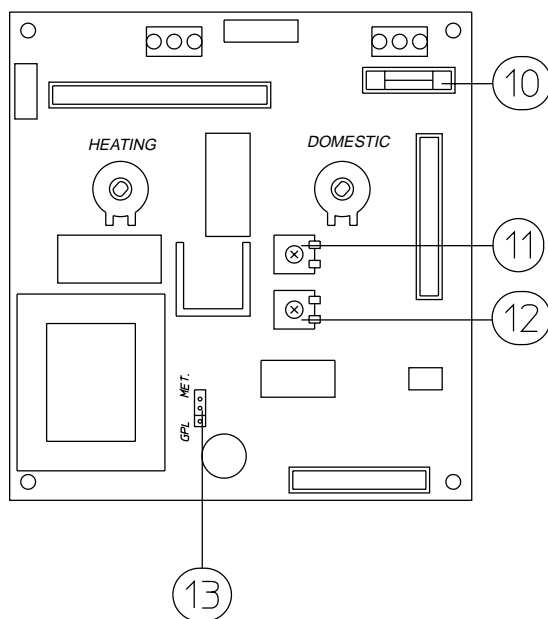
3.8 Pump antiblock function.

The boiler is equipped with a function that starts the pump at least once every 24 hours for the duration of 30 seconds in order to reduce the risk of the pump becoming blocked due to prolonged inactivity.

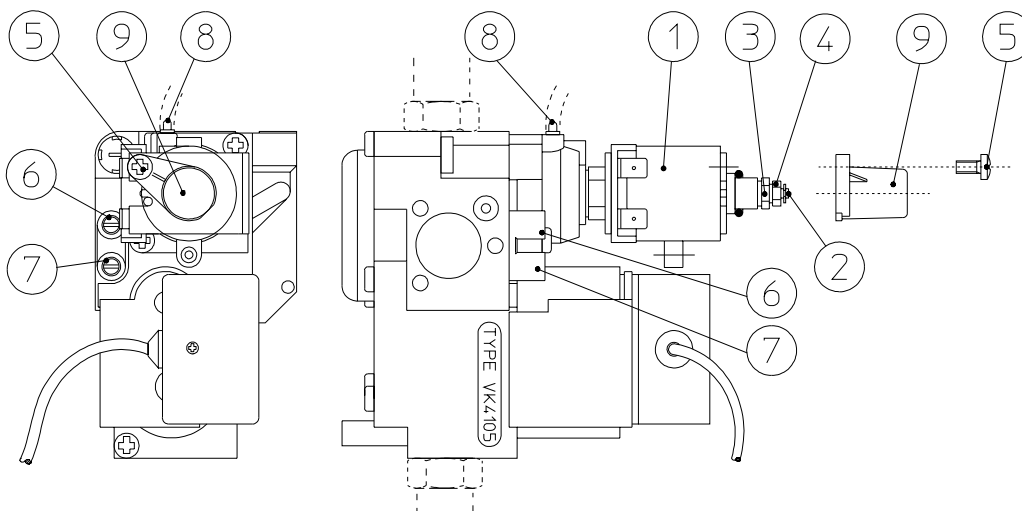
3.9 Boiler antifreeze function.

The boiler is equipped with an antifreeze function, therefore if the system return water is below 4°C, the boiler starts up and functions until reaching 43°C.

Zeus Maior electronic card



Valve VK 4105 for Zeus Maior



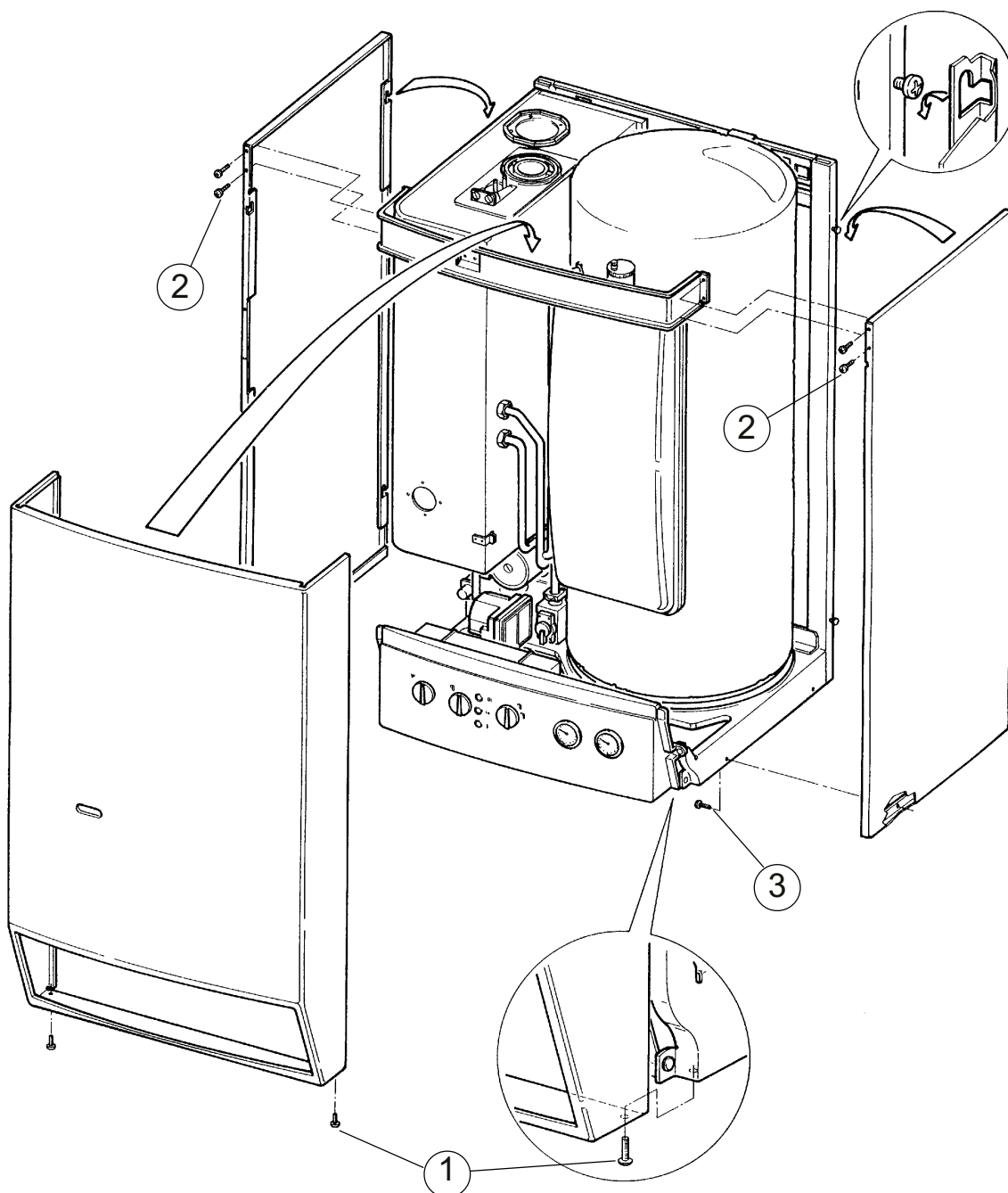
Key:

- | | |
|--------------------------------------|--|
| 1 - Coil | 7 - Gas valve inlet pressure socket |
| 2 - Coil pin | 8 - Air pressure socket hose connector |
| 3 - Minimum power adjustment screw | 9 - Protection hood |
| 4 - Maximum power adjustment screw | 10 - 2A fuse |
| 5 - Protection hood fixing screw | 11 - Slow ignition adjustment trimmer |
| 6 - Gas valve outlet pressure socket | 12 - Heating adjustment trimmer |
| | 13 - Jumper for operation with natural gas/LPG |

3.10 Casing removal.

To facilitate boiler maintenance the casing can be completely removed as follows:

- remove the plastic lower protection grid;
- undo the screws (1) on the bottom of the casing front;
- pull the bottom of the casing front outwards, pushing upwards (see figure);
- undo the screws (2) on the top of the casing front support sheet (see figure);
- undo the screws (3) on the bottom side of the boiler then push upwards a little in order to free the side.



3.11 Yearly appliance control and service.

The following checks and maintenance should be performed at least once a year.

- Clean the flue side of the heat exchanger.
- Clean the main burner.
- Make a visual inspection of the flue extraction hood for wear or corrosion.
- Check correct lighting and operation.
- Ensure correct settings of the burner in domestic water and heating phases.
- Check correct operation of control and adjustment devices and in particular:
 - intervention of electrical main switch on boiler;
 - system control thermostat intervention;
 - domestic water control thermostat intervention.
- Check tightness of gas supply circuit; insert a "U" or digital type pressure gauge in the pressure point upstream of the gas valve and then closing the boiler on-off valve and closing the gas valve, after 5 minutes there must be no pressure variation on the manometer;
- Check intervention of the device against no gas ionization flame control; intervention time must be less than ten seconds;
- Visually check for water leaks or oxidation from/on connections.
- Visually check that the water safety drain valve is not blocked.
- Make sure that expansion tank charge, after discharging system pressure and bringing it to the zero (read on boiler pressure gauge), is 0.8 bar.
- Check that the system static pressure (with system cold and after refilling the system by means of the filler cock) is between 1 and 1.2 bar.
- Check visually that the safety and control devices have not been tampered with and/or shorted, in particular:
 - temperature safety thermostat;
 - air pressure switch.
- Check the integrity of boiler Magnesium Anode.
- Check the condition and integrity of the electrical system and in particular:
 - electrical cables must be inside the channels;
 - no traces of black marking or burns.

3.12 Zeus 21 Maior series variable heat output.

HEAT OUTPUT (kcal/h)	HEAT OUTPUT (kW)	NATURAL GAS (G20)			BUTANE (G30)			PROPANE (G31)		
		GAS FLOW BURNER (m3/h)	NOZZLE PRESSURE BURNER (mbar) (mmH2O)		GAS FLOW BURNER (kg/h)	NOZZLE PRESSURE BURNER (mbar) (mmH2O)		GAS FLOW BURNER (kg/h)	NOZZLE PRESSURE BURNER (mbar) (mmH2O)	
21000	24,4	2,79	10,4	106	2,08	28,1	287	2,04	36,2	370
20000	23,3	2,66	9,5	96	1,98	25,3	259	1,95	32,4	330
19000	22,1	2,53	8,6	87	1,88	22,8	232	1,86	28,8	294
18000	20,9	2,40	7,7	79	1,79	20,4	208	1,76	25,6	261
17000	19,8	2,28	6,9	71	1,70	18,2	186	1,67	22,6	230
16000	18,6	2,15	6,2	63	1,60	16,2	165	1,58	19,9	203
15000	17,4	2,03	5,5	56	1,51	14,3	146	1,49	17,4	178
14000	16,3	1,90	4,8	49	1,42	12,6	129	1,40	15,2	155
13000	15,1	1,78	4,2	43	1,33	11,1	114	1,31	13,2	135
12000	14,0	1,66	3,6	37	1,23	9,8	100	1,22	11,5	117
11000	12,8	1,53	3,1	32	1,14	8,6	87	1,12	10,0	102
10000	11,6	1,41	2,6	27	1,05	7,5	77	1,03	8,8	89
9000	10,5	1,28	2,2	22	0,95	6,6	67	0,94	7,7	79
8000	9,3	1,15	1,8	18	0,86	5,9	60	0,84	7,0	71

3.13 Zeus 24 Maior series variable heat output.

HEAT OUTPUT (kcal/h)	HEAT OUTPUT (kW)	NATURAL GAS (G20)			BUTANE (G30)			PROPANE (G31)		
		GAS FLOW BURNER (m3/h)	NOZZLE PRESSURE BURNER (mbar) (mmH2O)		GAS FLOW BURNER (kg/h)	NOZZLE PRESSURE BURNER (mbar) (mmH2O)		GAS FLOW BURNER (kg/h)	NOZZLE PRESSURE BURNER (mbar) (mmH2O)	
24000	27,9	3,20	10,5	108	2,39	28,1	287	2,35	36,7	374
23000	26,7	3,07	9,8	100	2,29	25,9	264	2,26	33,7	344
22000	25,6	2,94	9,1	93	2,19	23,8	242	2,16	30,9	315
21000	24,4	2,82	8,5	87	2,10	21,7	222	2,07	28,2	288
20000	23,3	2,69	7,8	80	2,00	19,8	202	1,97	25,7	262
19000	22,1	2,56	7,2	74	1,91	18,1	184	1,88	23,3	238
18000	20,9	2,44	6,6	67	1,81	16,4	167	1,79	21,1	215
17000	19,8	2,31	6,0	61	1,72	14,8	151	1,69	19,0	194
16000	18,6	2,18	5,7	58	1,63	14,0	143	1,60	18,0	184
15000	17,4	2,06	4,9	50	1,53	11,9	121	1,51	15,3	156
14000	16,3	1,93	4,3	44	1,44	10,6	108	1,42	13,6	138
13000	15,1	1,80	3,8	38	1,34	9,4	96	1,32	12,0	122
12000	14,0	1,68	3,2	33	1,25	8,3	84	1,23	10,6	108
11000	12,8	1,55	2,7	28	1,15	7,3	74	1,14	9,2	94
10000	11,6	1,42	2,2	22	1,06	6,3	64	1,04	8,0	82
9000	10,5	1,29	1,7	17	0,96	5,5	56	0,95	7,0	71

N.W.: Pressure values specified in the table indicate the difference of pressure values between the gas valve outlet and the combustion chamber. Adjustments are therefore carried out with the differential pressure gauge ("U" or digital type) with the sensors inserted in the test pressure outlet of the modulating

adjustable gas valve and on the sealed chamber positive pressure test outlet . Power data specified in the table refer to a 1 metre intake/exhaust pipe. Gas flow rates refer to heat power below temperature of 15°C and at a pressure of 1013 mbar. Burner pressure values refer to use of gas at 15°C.

3.14 Zeus 21 Maior technical data.

Nominal heat output	kW (kcal/h)	26,3 (22629)		
Min. heat output	kW (kcal/h)	10,9 (9335)		
Nominal heating power (useful)	kW (kcal/h)	24,4 (21000)		
Min. heating power (useful)	kW (kcal/h)	9,3 (8000)		
Useful thermal effc. at nominal output	%	92,8		
Useful thermal effc. at 30% load of nominal power	%	89,7		
Heat loss at shell with burner On/Off	%	0,70/0,90		
Heat loss at flue with burner On/Off	%	6,50/0,06		
		G20	G30	G31
Nozzle diam.	mm	1,30	0,75	0,75
Supply pressure	mbar (mmH ₂ O)	20 (204)	29 (296)	37 (377)
Max. working pressure heating circuit	bar	3		
Max. working temp. heating circuit	° C	90		
Adjustable temp. heating	° C	43 - 90		
Expansion tank total volume	l	8		
Expansion tank preload	bar	0,8		
Water contained in boiler	l	3,5		
Available head with flowrate 1000 l/h	kPa (mH ₂ O)	22,5 (2,3)		
Useful heat output hot water production	kW (kcal/h)	24,4 (21000)		
Adjustable temp. domestic hot water	° C	20 - 60		
Flow limiter	l/min	10		
Min. pressure (dynamic) domestic circuit	bar	0,1		
Max. working pressure domestic circuit	bar	8		
Min. drawing domestic hot water	l/min	15,2		
Specific delivery (ΔT 30° C)	l/min	11,4		
Specific delivery in cont. duty (ΔT 30° C)	kg	134		
Boiler weight filled	kg	70		
Boiler weight empty				
Electrical connection	V/Hz	230/50		
Nominal absorption	A	0,68		
Installed electrical power	W	140		
Power absorbed by circulating pump	W	78		
Power absorbed by fan	W	35		
Equipment electrical system protection	-	IP44		
		G20	G30	G31
Delivery in weight of fumes at nominal output	kg/h	56	61	61
Delivery in weight of fumes at min. output	kg/h	59	65	67
CO ₂ at Q Nom./Min	%	6,7/2,5	7,1/2,6	7,0/2,5
CO at 0% O ₂ at Q Nom./Min	ppm	68/84	51/109	51/109
NO _x at 0% O ₂ at Q Nom./Min	ppm	163/96	194/105	185/99
Temp. fumes at nominal output	° C	118	122	125
Temp. fumes at min. output	° C	97	100	99

Control temperature at domestic water flow rate at 8 l/min. and input temperature of 15°C.
Flue temperature values refer to air inlet temperatures of 15°C.

3.15 Zeus 24 Maior series technical data.

Nominal heat output	(kW) kcal/h	30,3 (26030)		
Min. heat output	(kW) kcal/h	12,2 (10466)		
Nominal heating power (useful)	(kW) kcal/h	27,9 (24000)		
Min. heating power (useful)	(kW) kcal/h	10,5 (9000)		
Useful thermal effic. at nominal output	%	92,2		
Useful thermal effic. at 30% load of nominal power	%	89,8		
Heat loss at shell with burner On/Off	%	1,1/0,85		
Heat loss at flue with burner On/Off	%	6,7/0,06		
		G20	G30	G31
Nozzle diam.	mm	1,30	0,75	0,75
Supply pressure	mbar (mm H ₂ O)	20 (204)	29 (296)	37 (377)
Max. working pressure heating circuit	bar	3		
Max. working temp. heating circuit	° C	90		
Adjustable temp. heating	° C	43 - 90		
Expansion tank total volume	l	8		
Expansion tank preload	bar	0,8		
Water contained in boiler	l	4		
Available head with flowrate 1000 l/h	kPa (m H ₂ O)	29,4 (3,0)		
Useful heat output hot water production	(kW) kcal/h	27,9 (24000)		
Adjustable temp. domestic hot water	° C	20 - 60		
Flow limiter	l/min	12		
Min. pressure (dynamic) domestic circuit	bar	0,1		
Max. working pressure domestic circuit	bar	8		
Min. drawing domestic hot water	l/min	16,8		
Specific delivery (ΔT 30° C)	l/min	13,9		
Specific delivery in cont. duty (ΔT 30° C)	kg	138		
Boiler weight filled	kg	74		
Boiler weight empty				
Electrical connection	V/Hz	230/50		
Nominal absorption	A	0,76		
Installed electrical power	W	155		
Power absorbed by circulating pump	W	90		
Power absorbed by fan	W	35		
Equipment electrical system protection	-	IP44		
		G20	G30	G31
Delivery in weight of fumes at nominal output	kg/h	67	69	71
Delivery in weight of fumes at min. output	kg/h	71	79	79
CO ₂ at Q Nom./Min	%	6,5/2,3	7,2/2,4	7,0/2,4
CO at 0% O ₂ at Q Nom./Min	ppm	64/104	89/112	60/130
NO _x at 0% O ₂ at Q Nom./Min	ppm	150/83	240/108	201/102
Temp. fumes at nominal output	° C	115	117	120
Temp. fumes at min. output	° C	85	83	92

Control temperature at domestic water flow rate at 8 l/min. and input temperature of 15°C.

Flue temperature values refer to air inlet temperatures of 15°C.



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